84 Chapter 2 Boolean Algebra and Logic Gates

Name	Graphic symbol	Algebraic function	Truth table
AND	<i>x</i>	$F = x \cdot y$	$\begin{array}{c cccc} x & y & F \\ \hline 0 & 0 & 0 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \\ 1 & 1 & 1 \\ \end{array}$
OR	<i>x</i>	F = x + y	$\begin{array}{c cccc} x & y & F \\ \hline 0 & 0 & 0 \\ 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 1 \\ \end{array}$
Inverter	xF	F = x'	$ \begin{array}{c cc} x & F \\ \hline 0 & 1 \\ 1 & 0 \end{array} $
Buffer	<i>x</i> —— <i>F</i>	F = x	$ \begin{array}{c cc} x & F \\ \hline 0 & 0 \\ 1 & 1 \end{array} $
NAND	<i>x</i>	F = (xy)'	$\begin{array}{c cccc} x & y & F \\ \hline 0 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \\ \end{array}$
NOR	x y F	F = (x + y)'	$\begin{array}{c cccc} x & y & F \\ \hline 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \\ 1 & 1 & 0 \\ \end{array}$
Exclusive-OR (XOR)	x y F	$F = xy' + x'y$ $= x \oplus y$	$\begin{array}{c cccc} x & y & F \\ \hline 0 & 0 & 0 \\ 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \\ \end{array}$
Exclusive-NOR or equivalence	x y F	$F = xy + x'y'$ $= (x \oplus y)'$	$\begin{array}{c cccc} x & y & F \\ \hline 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \\ 1 & 1 & 1 \\ \end{array}$

FIGURE 2.5
Digital logic gates