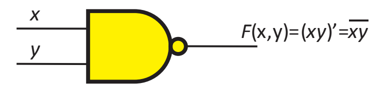
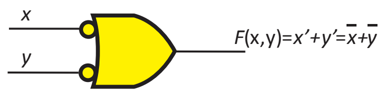
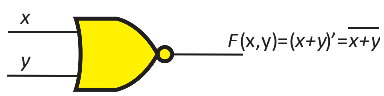
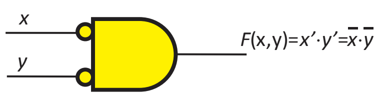
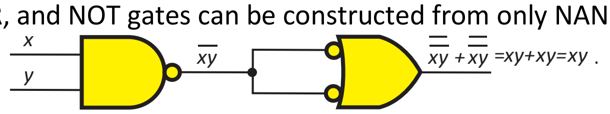
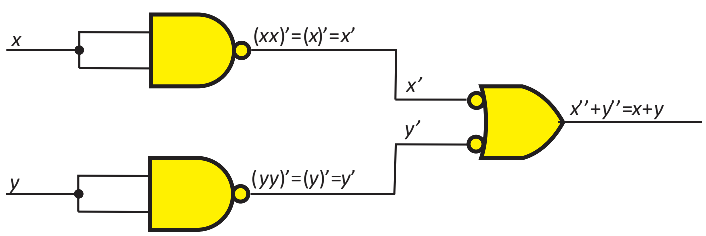
Name	Graphic Symbol	Algebraic Function	Truth Table		
			x	y	F
NAND		$F = \overline{xy}$	0	0	1
			0	1	1
			1	0	1
			1	1	0
			$\overline{x}$	$\overline{y}$	F
NAND		$F = \overline{x} + \overline{y}$	1	1	1
			1	0	1
			0	1	1
			0	0	0
			x	y	F
NOR		$F = \overline{x + y}$	0	0	1
			0	1	0
			1	0	0
			1	1	0
			$\overline{x}$	$\overline{y}$	F
NOR		$F = \overline{x} \cdot \overline{y}$	1	1	1
			1	0	0
			0	1	0
			0	0	0

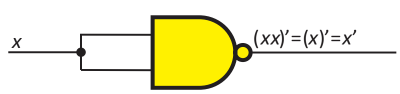
We know that all logic functions can be constructed from AND, OR, and NOT gates. The foregoing statement is equivalent to saying that the collection of gates including AND, OR, and NOT is functionally complete. To demonstrate that a NAND gate is functionally complete, we need to show that the AND, OR, and NOT gates can be constructed from only NAND gates.



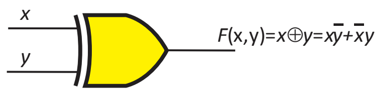
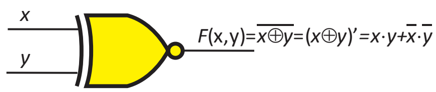
AND Gate



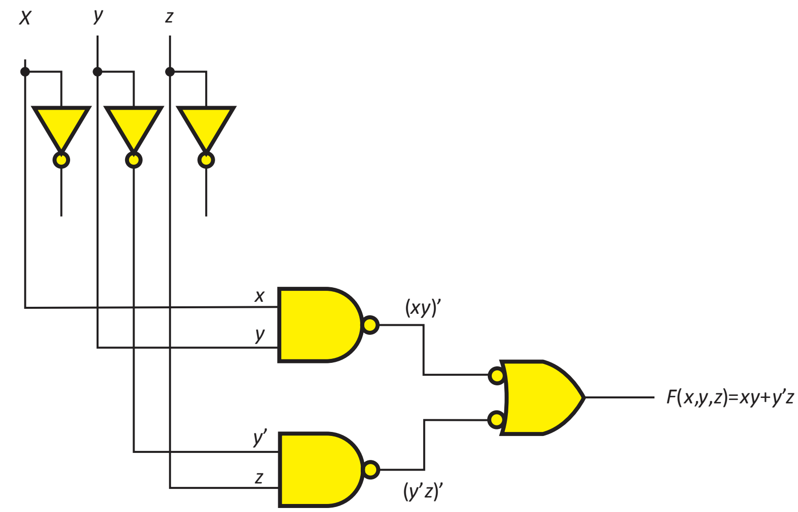
OR Gate



NOT Gate

Name	Graphic Symbol	Algebraic Function	x	y	F
XOR (Exclusive-OR)		$F = x \oplus y$	**0**	**0**	**0**
			0	**1**	**1**
			1	**0**	**1**
			1	**1**	**0**
Exclusive-NOR		$F = \overline{x \oplus y}$	**0**	**0**	**1**
			0	**1**	**0**
			1	**0**	**0**
			1	**1**	**1**

In-class exercise: Using only NAND gates draw the logic diagram for the Boolean function $F(x,y,z) = xy + y'z$.



$$F(x, y, z) = xy + y'z$$