CAO: Lecture 2
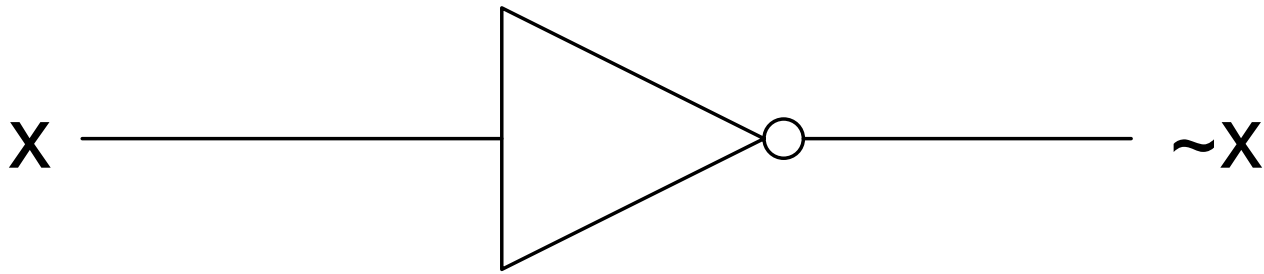# Logic Gates

Topics Covered
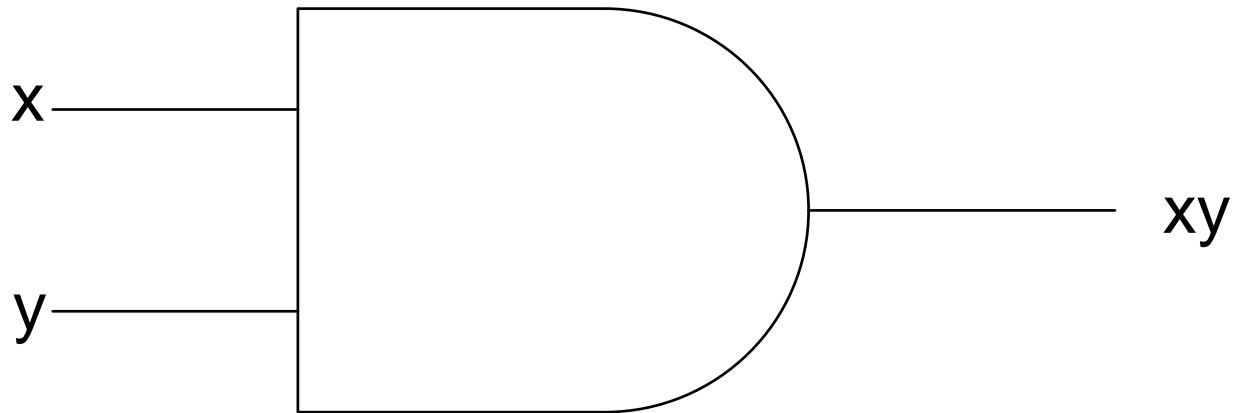
- NOT gate
- AND gate
- OR gate
- XOR gate
- What are digital circuits?
- NOR gate

NOT Gate
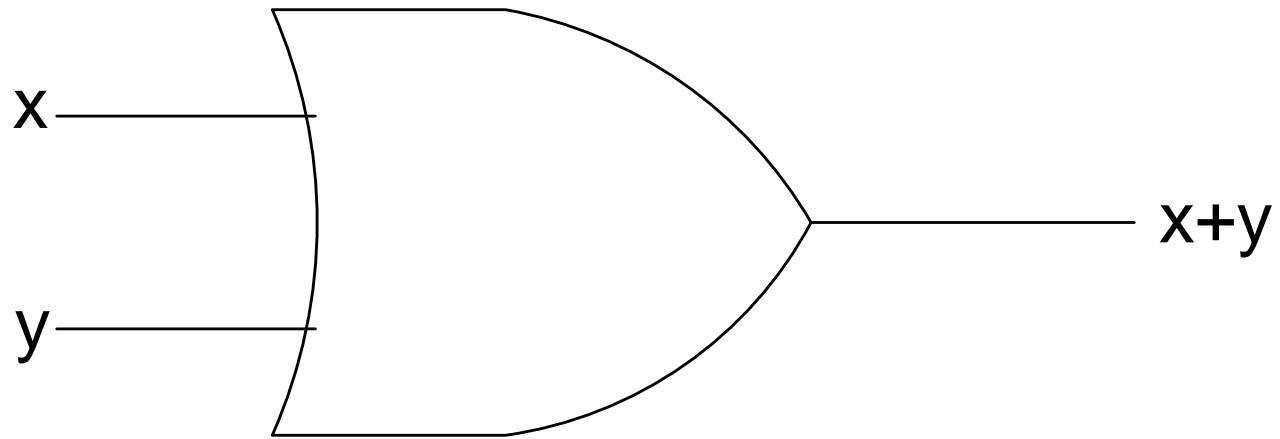
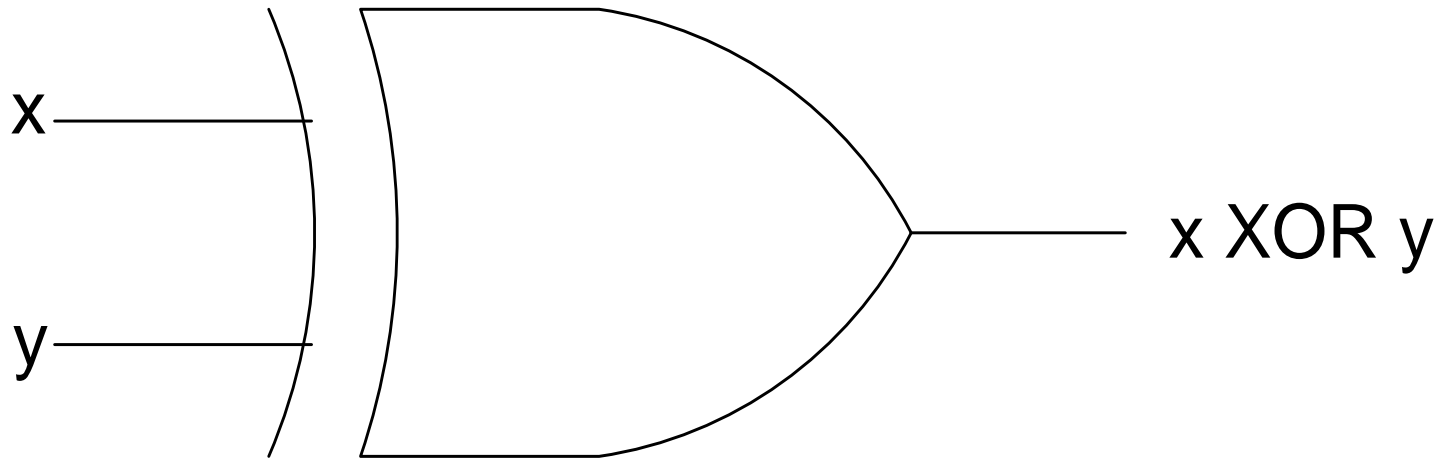- Also known as an inverter

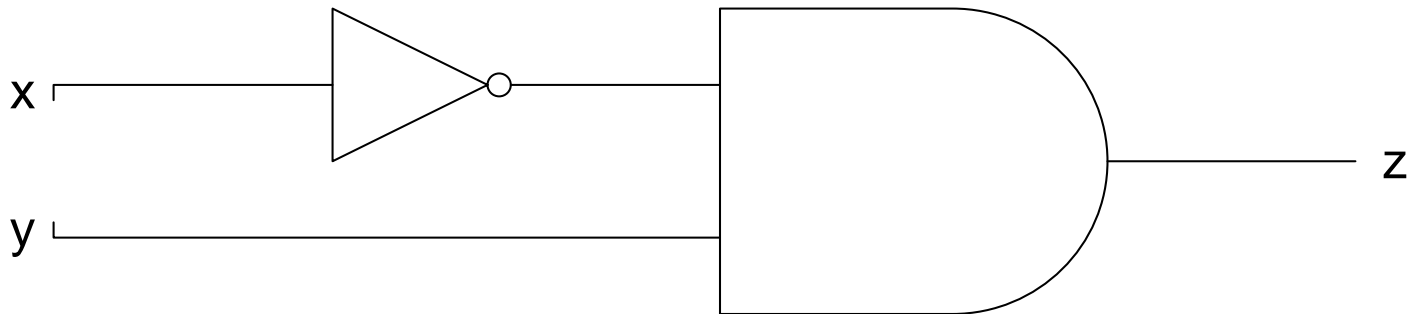X ─────────▷○───────── ~X

AND Gate

x ———————

y ———————

xy

OR Gate

x

y

x+y

XOR Gate
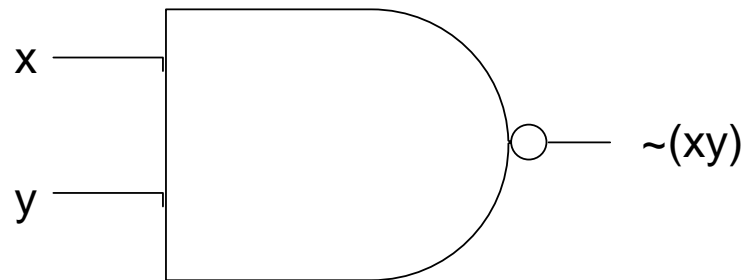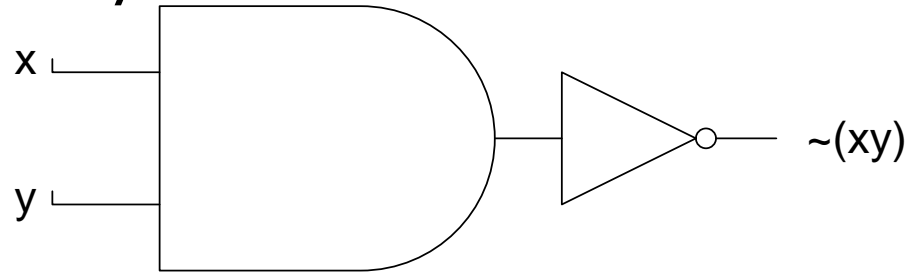
What are digital circuits?

- System of logic components that model some Boolean expression
- Inputs → Digital Circuit → Output
- Example: ~x · y = z

NAND Gate

- ~(xy)

x

y

~(xy)

x

y

~(xy)

NOR GATE

- ~(x+y)
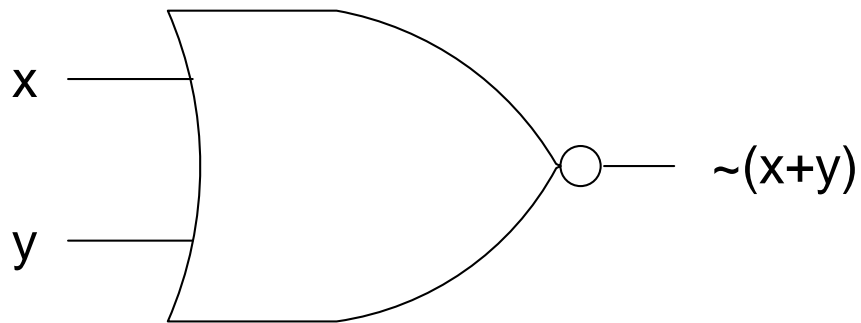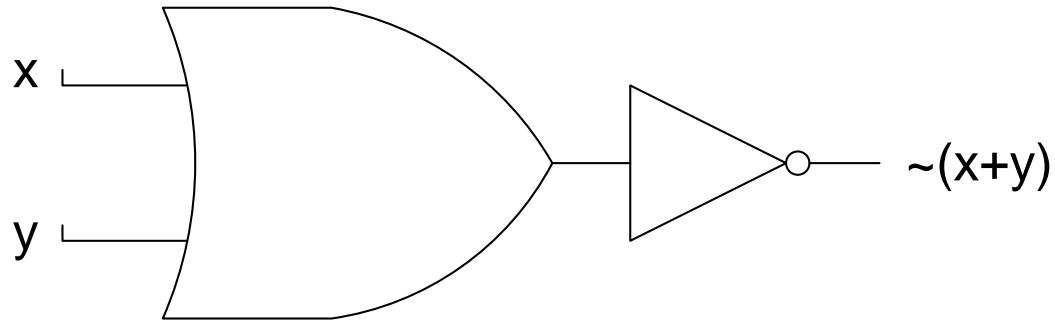
(1) $x + 0 = x$	(2) $x \cdot 0 = 0$
(3) $x + 1 = 1$	(4) $x \cdot 1 = x$
(5) $x + x = x$	(6) $x \cdot x = x$
(7) $x + x' = 1$	(8) $x \cdot x' = 0$
(9) $x + y = y + x$	(10) $xy = yx$
(11) $x + (y + 2) = (x + y) + 2$	(12) $x(yz) = (xy)z$
(13) $x(y + z) = xy + xz$	(14) $x + yx = (x + y)(x + z)$
(15) $(x + y)' = x'y'$	(16) $(xy)' = x' + y'$
(17) $(x')' = x$	

Table (1.1) Basic identities of Boolean Algebra.