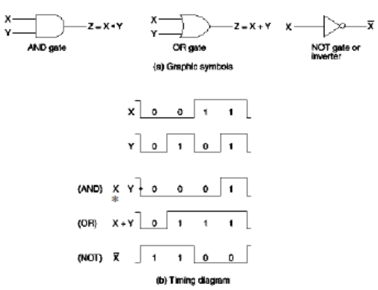
Digital Logic Design

Lecture 05: Combinational Logic Circuit & Boolean Algebra

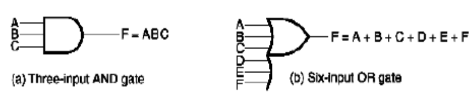
Combinational Logic Circuits

- Logic Gates: Control the flow of information?
- Represent Logical Operations (Functions)
  - Inputs are like arguments to a function
  - Outputs are like result of the function
  - Fundamental Set
    - AND
    - OR
    - NOT
    - Transmission Gate
- Truth Tables…

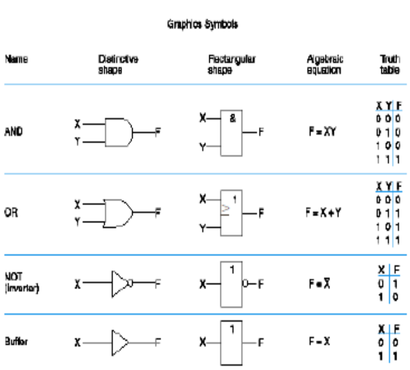
Digital Logic Gates

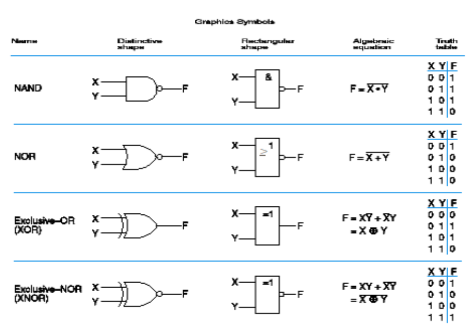


Gates with more than Two Inputs



Digital Logic Gates





Binary Boolean Operations

- All possible outcomes of a 2-input Boolean function

A	B	F_0	F_1	F_2	F_3	F_4	F_5	F_6	F_7	F_8	F_9	F_{10}	F_{11}	F_{12}	F_{13}	F_{14}	F_{15}
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
0	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
1	0	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
		NULL	$A \cdot B$		A		B	$A \oplus B$	$A+B$	$\overline{A+B}$	$\overline{A \oplus B}$	$\overline{B}$		$\overline{A}$		$\overline{A \cdot B}$	Identity