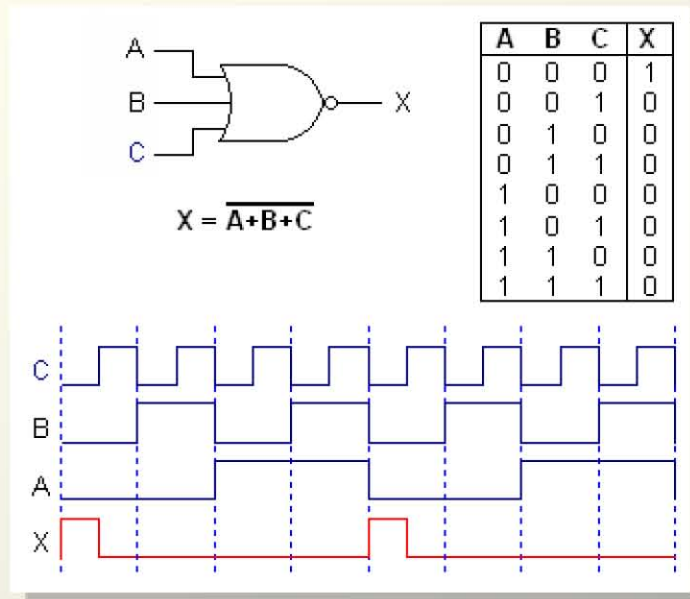


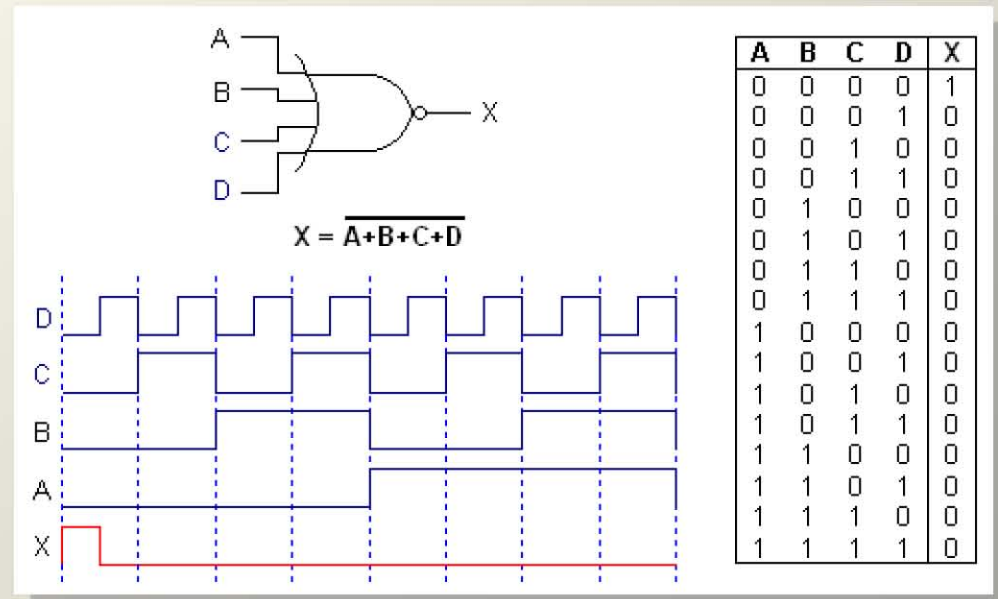
# Week 10

## **The NOR Gate**

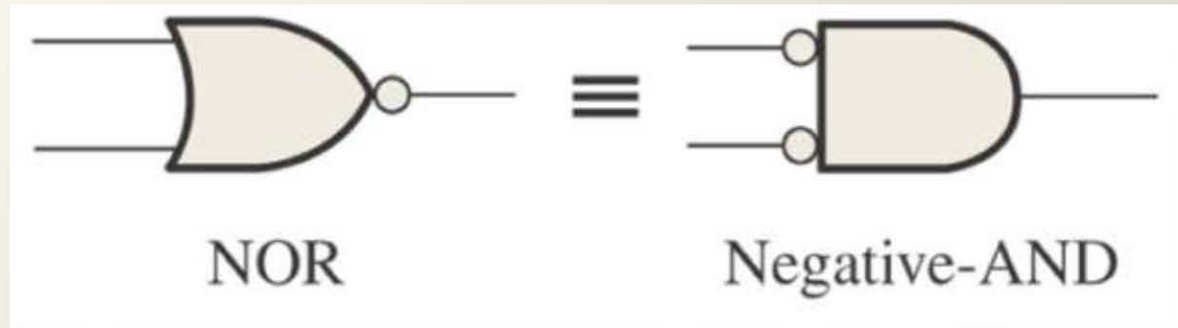
# The NOR Gate



3-Input NOR Gate

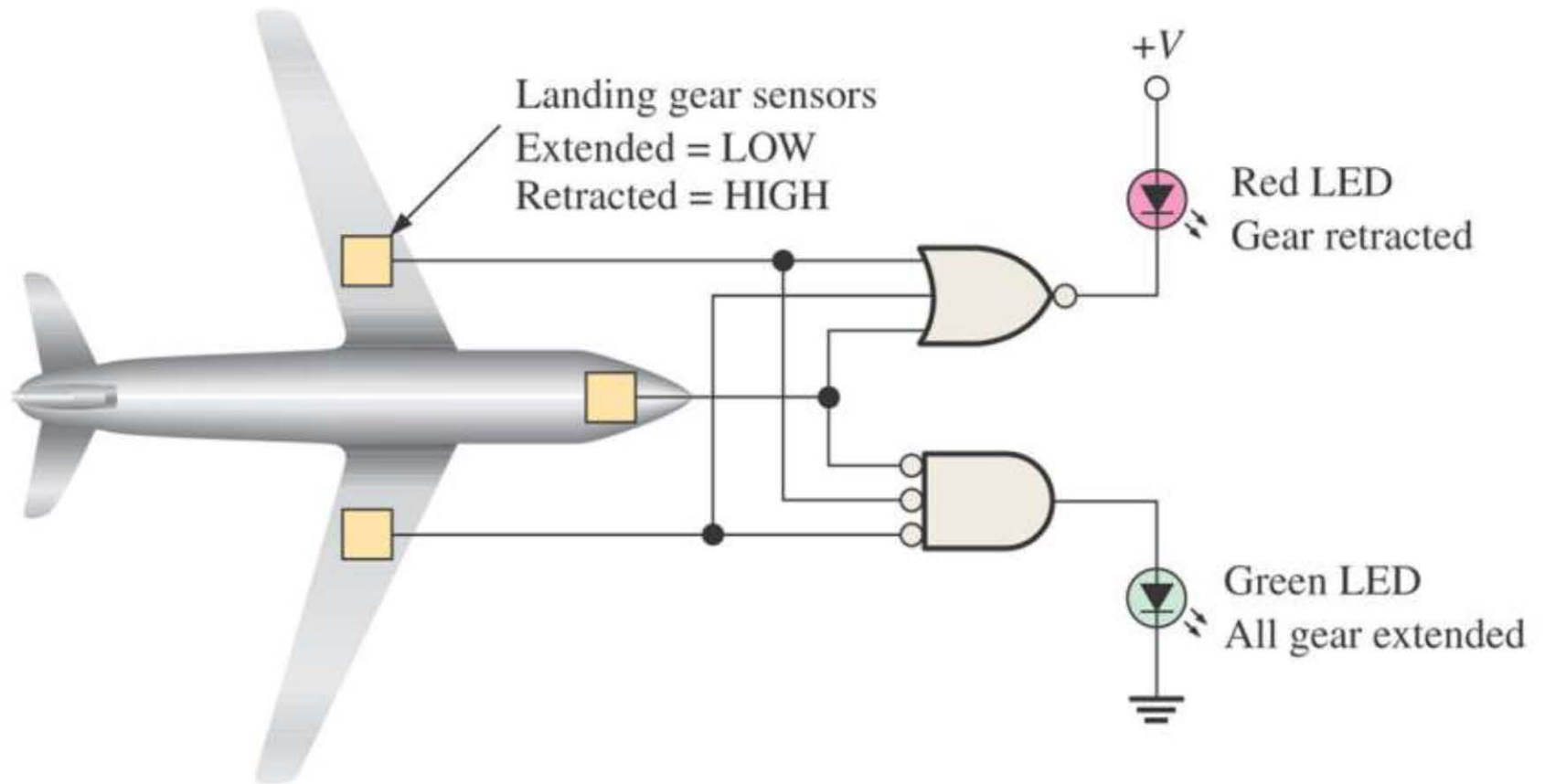


4-Input NOR Gate



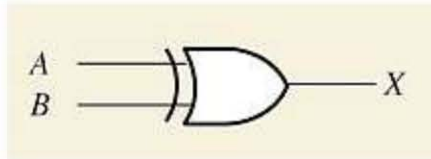
**Standard symbols representing the two equivalent operations of a NOR gate.**

part of an aircraft's functional monitoring system  
Indicates the status of the landing gears before landing

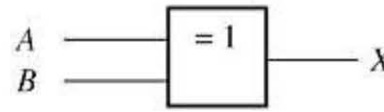


# **Exclusive-OR and Exclusive-NOR Gates**

# Exclusive-OR Gate



Distinctive shape symbol



Rectangular outline symbol

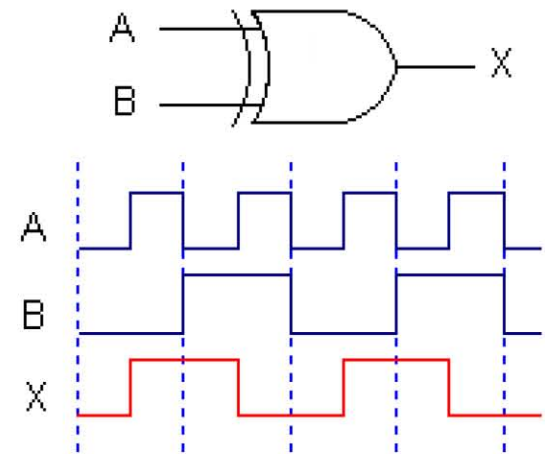
A	B	X
0	0	0
0	1	1
1	0	1
1	1	0

Truth table

0 = LOW  
1 = HIGH

$$X = A \oplus B$$

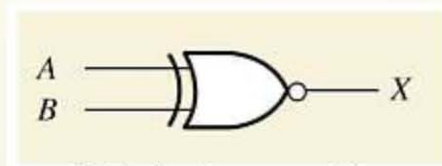
Boolean expression



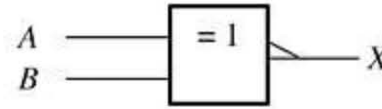
Pulsed waveforms

**The output of an XOR gate is HIGH whenever the two inputs are different.**

# Exclusive-NOR Gate



Distinctive shape symbol



Rectangular outline symbol

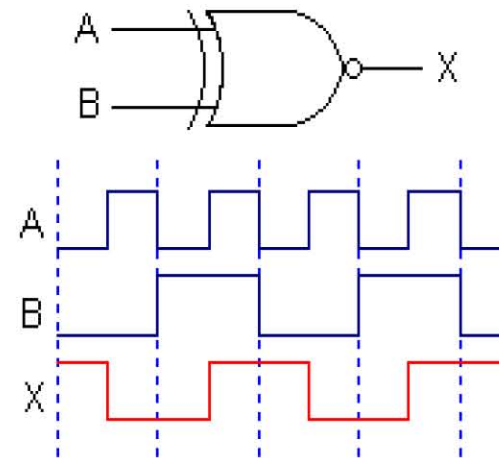
A	B	X
0	0	1
0	1	0
1	0	0
1	1	1

Truth table

0 = LOW  
1 = HIGH

$$X = \overline{A \oplus B}$$

Boolean expression



Pulsed waveforms

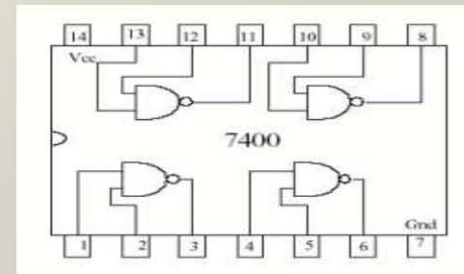
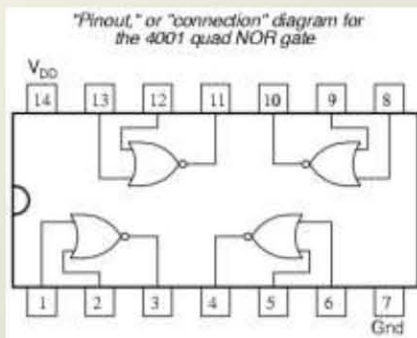
**The output of an XNOR gate is HIGH whenever the two inputs are identical.**

# Fixed-Function Logic



# Fixed-Function Logic

- IC Technology
  - CMOS Complementary Metal-Oxide semiconductor
  - TTL Transistor-Transistor Logic
  - CMOS series 74HCxx and 74CTxx high speed CMOS (the “T” indicates TTL compatibility)
  - TTL series 74LSxx low power



74LS00 Quad 2-input NAND gates

## Key Terms of lecture-3

- Inverter
- Truth table
- Timing diagram (waveform)
- Boolean expression (algebra)
- Gates
  - AND , NAND
  - OR , NOR
  - XOR , XNOR
- TTL
- CMOS