

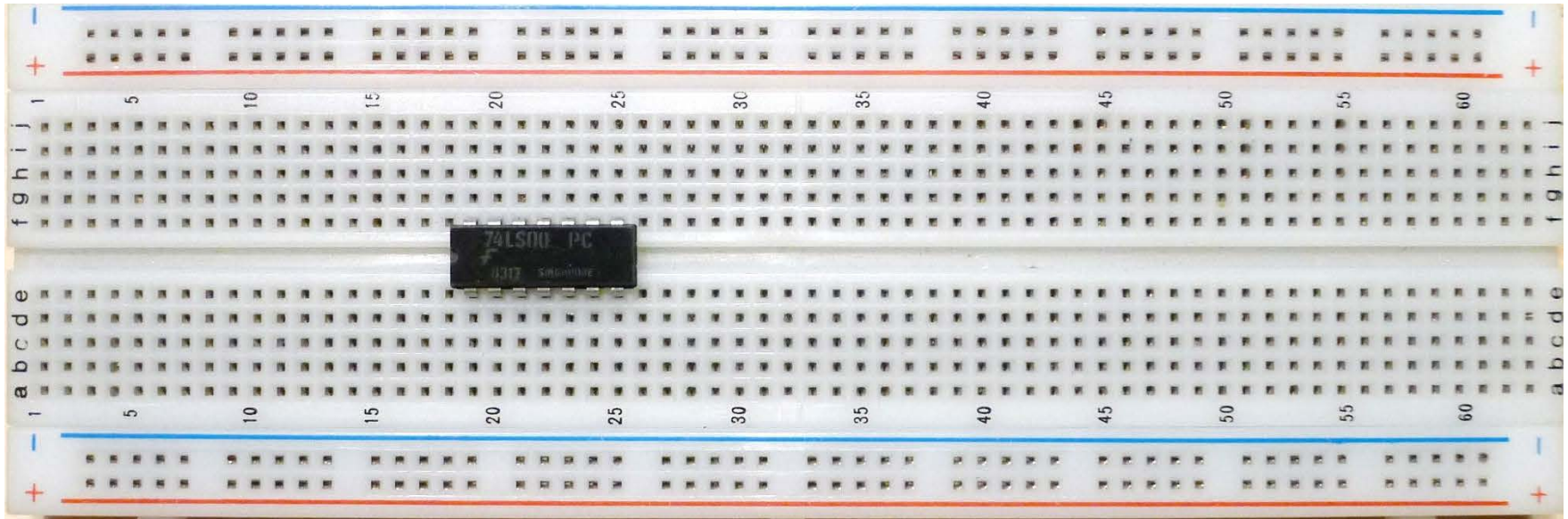
# ECED2200 – DIGITAL CIRCUITS

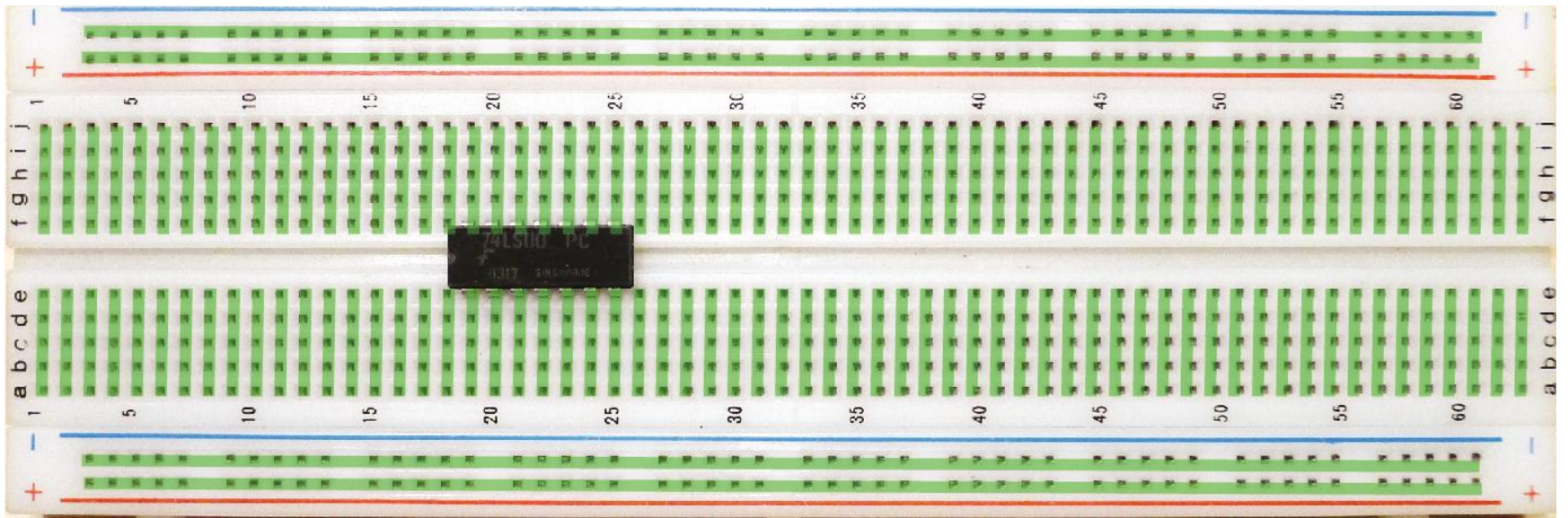
## Lab #1: Breadboards, Gates, Simulations

# GENERAL NOTES

- See updates to these slides: [www.colinoflynn.com/teaching](http://www.colinoflynn.com/teaching)
- These slides licensed under '[Creative Commons Attribution-ShareAlike 3.0 Unported License](https://creativecommons.org/licenses/by-sa/3.0/)'
- These slides are not the complete course – they are extended in-class
- You will find the following references useful, see [www.colinoflynn.com/teaching](http://www.colinoflynn.com/teaching) for more information/links:
  - The book “Bebop to the Boolean Boogie” which is available to Dalhousie Students
  - Course notes (covers almost everything we will discuss in class)
  - Various websites such as e.g.: [www.play-hookey.com](http://www.play-hookey.com)
  - The book “Contemporary Logic Design”, which was used in previous iterations of the class and you may have already

# PART 1: BREADBOARDS



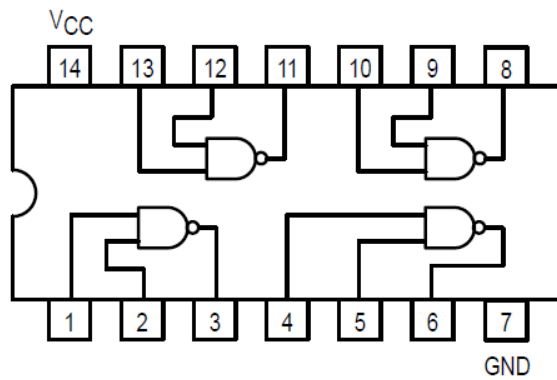


# DATASHEETS



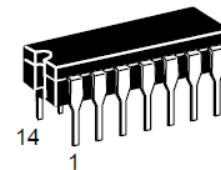
## QUAD 2-INPUT NAND GATE

- ESD > 3500 Volts



SN54/74LS00

QUAD 2-INPUT NAND GATE  
LOW POWER SCHOTTKY



J SUFFIX  
CERAMIC  
CASE 632-08

# PIN NUMBERING



# POWER?

## GUARANTEED OPERATING RANGES

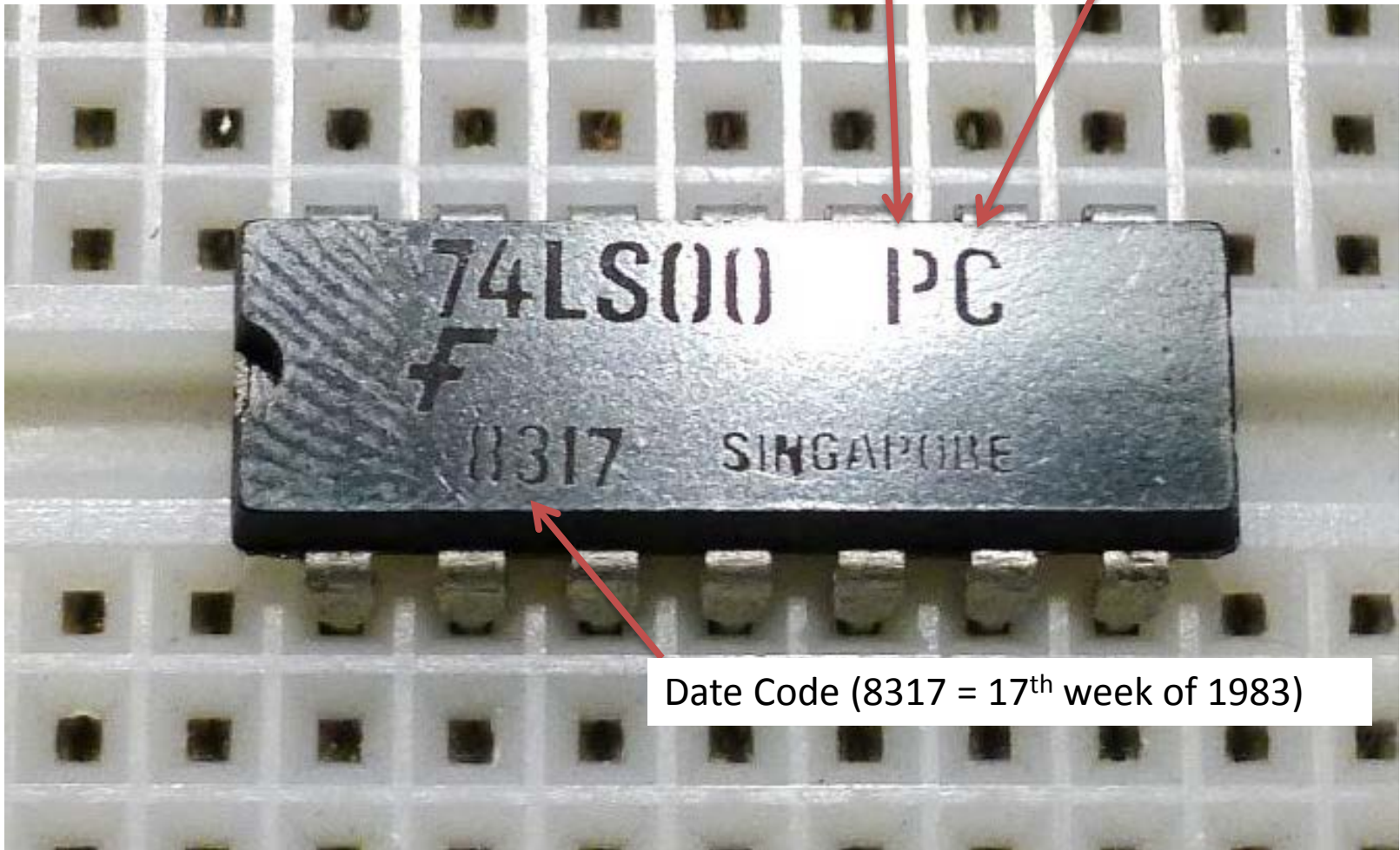
Symbol	Parameter		Min	Typ	Max	Unit
$V_{CC}$	Supply Voltage	54 74	4.5 4.75	5.0 5.0	5.5 5.25	V
$T_A$	Operating Ambient Temperature Range	54 74	-55 0	25 25	125 70	°C
$I_{OH}$	Output Current — High	54, 74			-0.4	mA
$I_{OL}$	Output Current — Low	54 74			4.0 8.0	mA



# NUMBER ON CHIP

Package Code  
(P = PDIP)

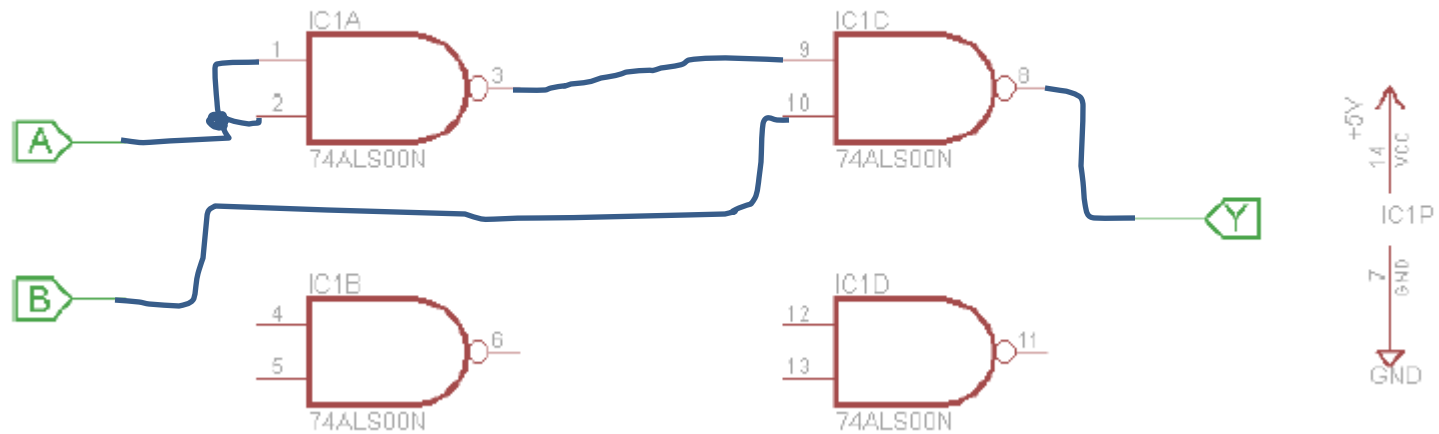
Temp Code  
(C=Commercial)



Date Code (8317 = 17<sup>th</sup> week of 1983)

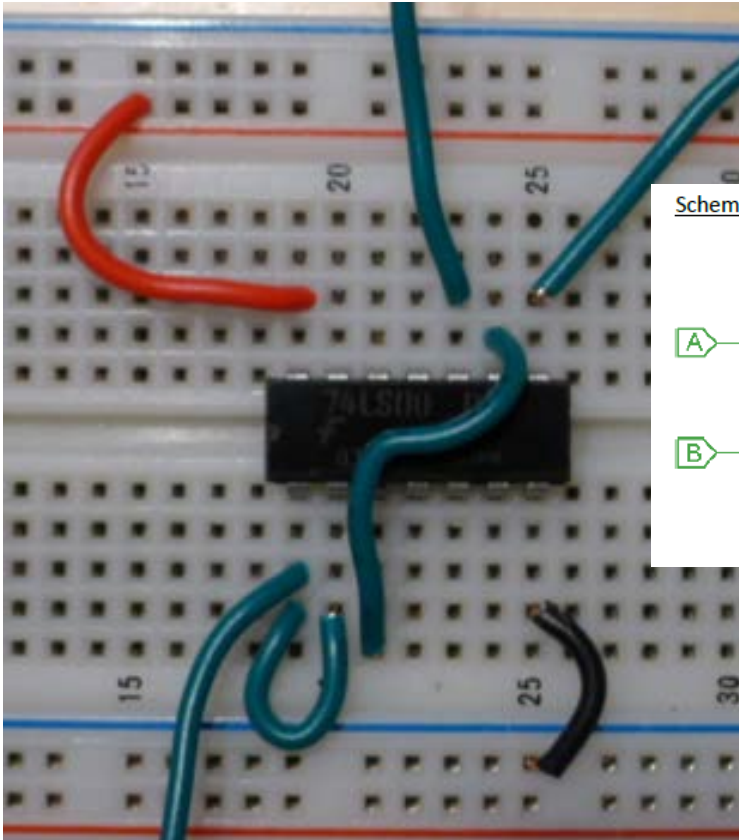
# EXAMPLE:

Schematic:



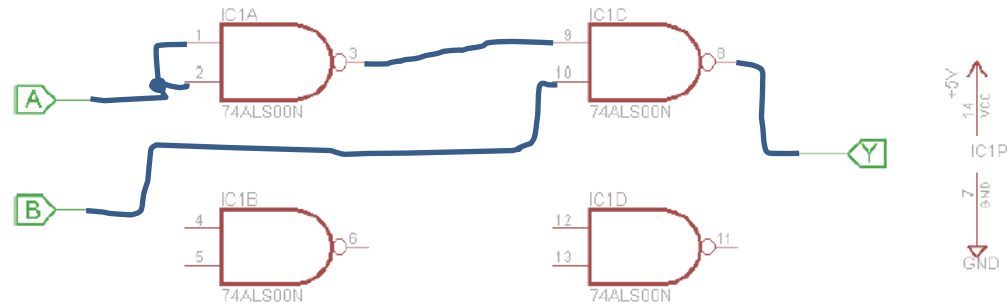
# IMPLEMENTATION

B



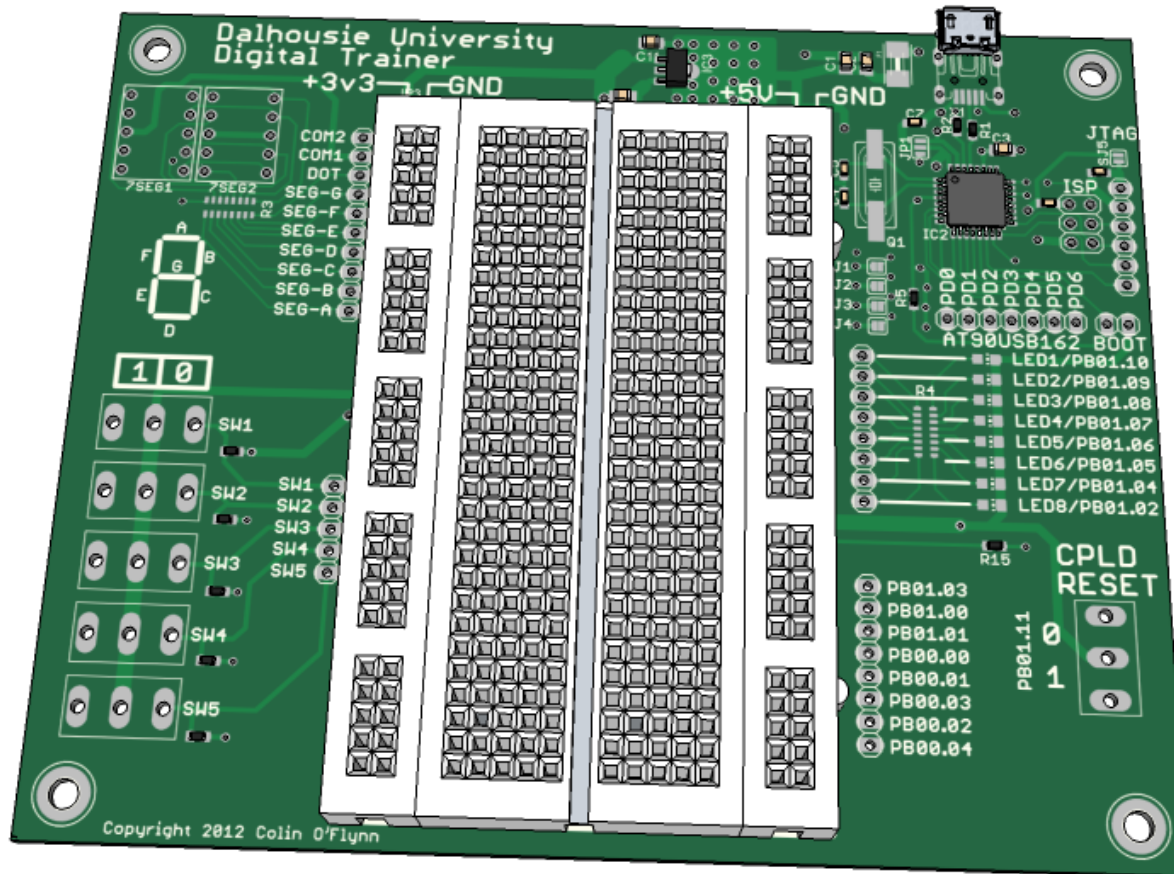
Y

Schematic:



- Make sure VCC & GND Correct!

# DIGITAL TRAINER



# PART 2: SIMULATION

- See video & lab handout from [www.colinoflynn.com/teaching](http://www.colinoflynn.com/teaching)

[http://coflynn.ee.dal.ca/xilinx\\_tools](http://coflynn.ee.dal.ca/xilinx_tools)