

**READINGS: Electronics Workbook 2 (ew2.pdf): Review Page 12.**

**Be sure to study the CD4013 and the CD4017 ICs**

*Assignment is due at the beginning of the next class, a one question quiz on this homework occurs after the lecture.*

**8.1a Drawing a Logic Circuit** (Estimated sketching time: under 2 minutes)

On a separate piece of paper copy the schematic that shows how to make an **OR** Gate out of three (3) **NAND** Gates on the bottom lower left of **Electronics Workbook 2, page 5.**

Be sure to label your circuit's inputs and outputs:

*Gate 1 In, Gate 2 In, Gate 1 Out, Gate 2 Out, and Gate 3 Out.*

**8.1b)** A single **CD4011** IC contains four (4 or quad) 2-input **NAND** gates - thus this circuit can actually be implemented using a single IC!

*Add the pin numbers for the CD4011 to your sketch.*

**8.2 Creating a Truth Table for a Logic Circuit**

**8.2a)** Using truth tables (entering the symbols **0** and **1** only) prove that the three **NAND** gates of problem 1, above, will actually perform the **OR** function, i.e., fill in the 5 columns of the truth table below.

Gate 1 In	Gate 2 In	Gate 1 Out	Gate 2 Out	Gate 3 Out
0	0			
0	1			
1	0			
1	1			

Table 8.1 Three NAND Gate Truth Table

**8.2b)** Are the leftmost two columns and the last column of Table 8.1 consistent with a logical **OR** Gate? **Yes** or **No**? - *if NOT, please correct your work <grin>*

**8.3)** Refer to Figure 8.2 and write out the truth table for the circuit.

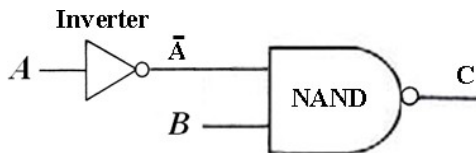


Figure 8.2 Inverter/NAND Gate Circuit

A	NOT A	B	C
0	1	0	
0	1	1	
1	0	0	
1	0	1	

Table 8.2 Inverter/NAND Gate Truth Table

**8.4)** Refer to Figure 8.3 and write out the truth table for the circuit.

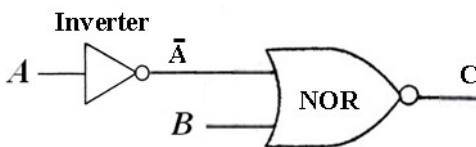


Figure 8.3 Inverter/NOR Gate Circuit

A	NOT A	B	C
0	1	0	
0	1	1	
1	0	0	
1	0	1	

Table 8.3 Inverter/NOR Gate Truth Table