Electronics and Instrumentation

Name _____ ENGR-4300 Fall 1999 Section _____

Homework #5
Number Systems, Boolean Algebra and Logic Gates

Due: 1 December

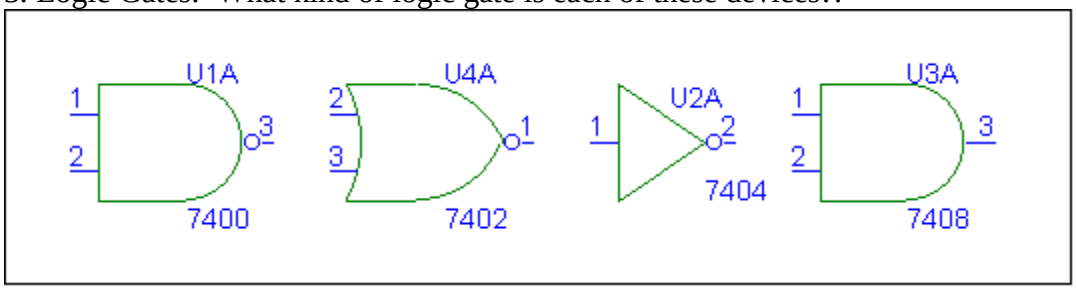
1. Number Systems: Convert the decimal numbers to binary and vice-versa (do not look them up in the table.):

Binary	Decimal
0101	
1101	
	6
	15

2. Boolean Algebra: Determine which boolean operation is represented by the following table:

B	A	Result
0	0	0
0	1	1
1	0	1
1	1	1

3. Logic Gates: What kind of logic gate is each of these devices?:



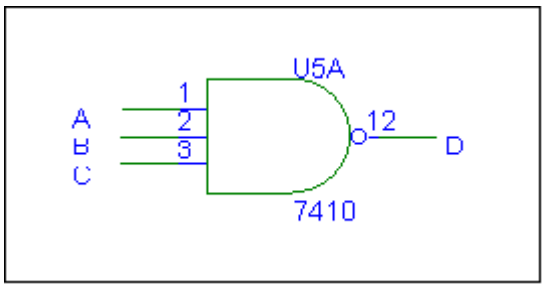
4. Boolean Algebra: Simplify the expression below.

$D = (C + 0) \cdot (A + \overline{(A \cdot B)})$

5. Combinational Logic: Draw a logic circuit that performs the following function.

$D = A \cdot \overline{(C + (B \cdot \overline{A}))}$

6. Fill in the truth table for the circuit below.



C	B	A	D
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

Some reference materials:

http://www.ied.edu.hk/has/phys/de/de-ba.htm

http://www.dgp.utoronto.ca/people/van/courses/csc258/bool.html

7. Design a monostable multivibrator that outputs a single 10msec pulse using a 555 timer. Perform a PSpice simulation of your circuit to show that it works. Some useful links follow.

http://www.uoguelph.ca/~antoon/circ/monovib.htm

http://www.hobby-electronics.com/MonostableMultivibrator.htm