



University of British Columbia  
Electrical and Computer Engineering  
Digital Design and Microcomputers  
CPEN312

## Lab 1 - Logic Gates

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In this laboratory you will implement a simple digital system using logic gate integrated circuits.

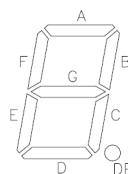
### Tools and Parts Needed

1. Wire stripper, pliers, wire, and breadboard which are available in the lab. If you don't own these tools, you can borrow them from the lab tech in the lab. Return them after you finish or your grade for this lab will be zero!
2. 74HC00, 74HC04 integrated circuits, 7 x 1k resistors, as well as the common anode 7-segments display LSHD-F101. These parts will be provided in the lab.

### Activities

- 1) Find the pin out of the 74HC00, 74HC04 integrated circuits (ICs) and the LSHD-F101 display. Draw the top view of the ICs and display on a piece of paper showing all the gates and power supply connections.
- 2) Design and simulate with Multisim a 2-bit decoder that displays the letters A, b, c, d using a 7-segment display as indicated in the table below. The segments are turned on with logic 0. Use ONLY 2-input NAND as well as NOT gates.

Inputs		Segments On
B	A	
0	0	All but D
0	1	All but A, B
1	0	D, E, G
1	1	All but A, F



- 3) The logic gate integrated circuits we have for this lab need a DC power supply to operate. 5V DC is the required power supply for this purpose. Insert the 74HC00 and 74HC04 ICs into the breadboard and wire both the power and ground pins of the ICs. Assemble and test the circuit you designed in point two of the pre-lab. Remember to limit the maximum current per segment by adding a 1k resistor in series as it was shown in the lecture. Demonstrate your results to the teaching assistant on duty in order to get a grade for your work.