

Lab 03: Transistors/Switches

A. Why?

Transistors are the switches we use on/off switches to manipulate the voltages/currents that represent binary data.

B. Outcomes

After this lab, you should be able to

- Take a simple voltage diagram and determine whether an output is connected to the voltage source or ground (or both — hope not!)

C. Questions

1. Take the diagram in Problem 3.2 of the text (page 82); ignore the problem — we're just using the diagram. Each dashed circle represents a possible transistor, either p-type or n-type. For each of the transistors and each possible input (on or off), figure out which transistors are or are not behaving like wires and whether or not the output is connected to voltage or ground. Fill in the corresponding table entry below. (The first 2 entries are already done for you.)

Top Transistor	Bottom Transistor	Input	Top Transistor is a wire?	Bottom Transistor is a wire?	Output Connected to Voltage?	Output Connected to Ground?
n-type	n-type	0	No	No	No	No
n	n	1	Yes	Yes	Yes	Yes
n	p	0				
n	p	1				
p	n	0				
p	n	1				
p	p	0				
p	p	1				

2. Take the diagram in Problem 3.4 of the text (page 83); again, ignore the problem; just use the diagram. For each possible A and B input, figure out the value of C. (If C is connected to voltage, it's 1; if C is connected to ground, it's 0. You shouldn't need this, but if C is connected to both, use "!!"; if it's connected to neither, use "?".)

A	B	C
0	0	
0	1	
1	0	
1	1	

