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Lab 1 Report:

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Purpose:

Construct and understand basic logic gates using electrical components. Use the function generator to create timing diagrams. The timing diagrams graph the state of each input, and the resulting output. If the line is in the "up" position, it indicates the component is powered, and vice-versa.

Part I: INVERTER Gate

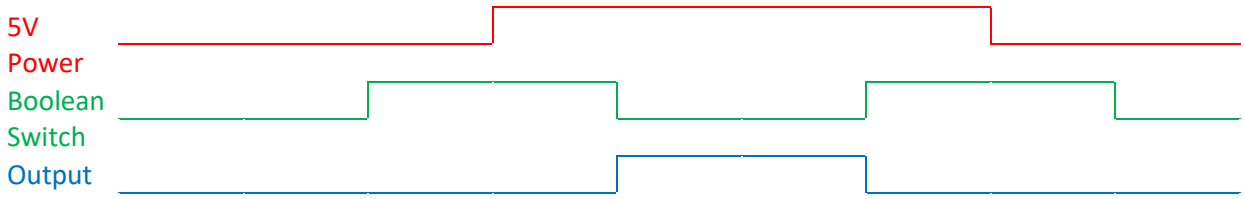

Figure 1A: Timing Diagram of the INVERTER Gate

Summary:

For the Inverter gate, the power input was tuned to be approximately 5 volts (denoted as 5V Power in Figure 1A). A basic circuit was constructed on the electronic breadboard, making use of an NMOS gate to either connect, or disconnect, the circuit to ground.

Note: The INVERTER Gate was the only gate in this lab that was explicitly used as an input source. For the other gates, power was assumed to always be supplied, as gates require power to function.

Part II: AND Gate

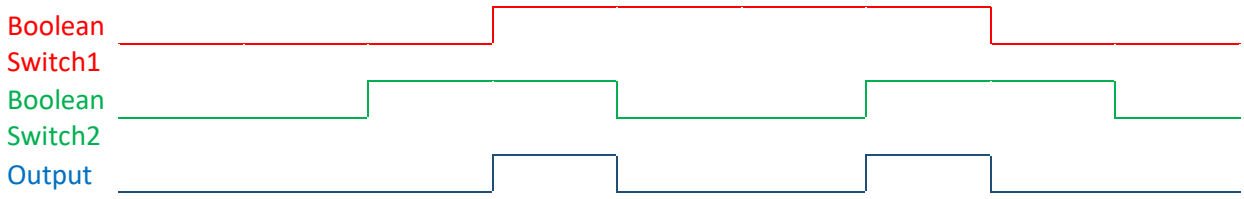

Figure 2A: Timing Diagram of the AND Gate

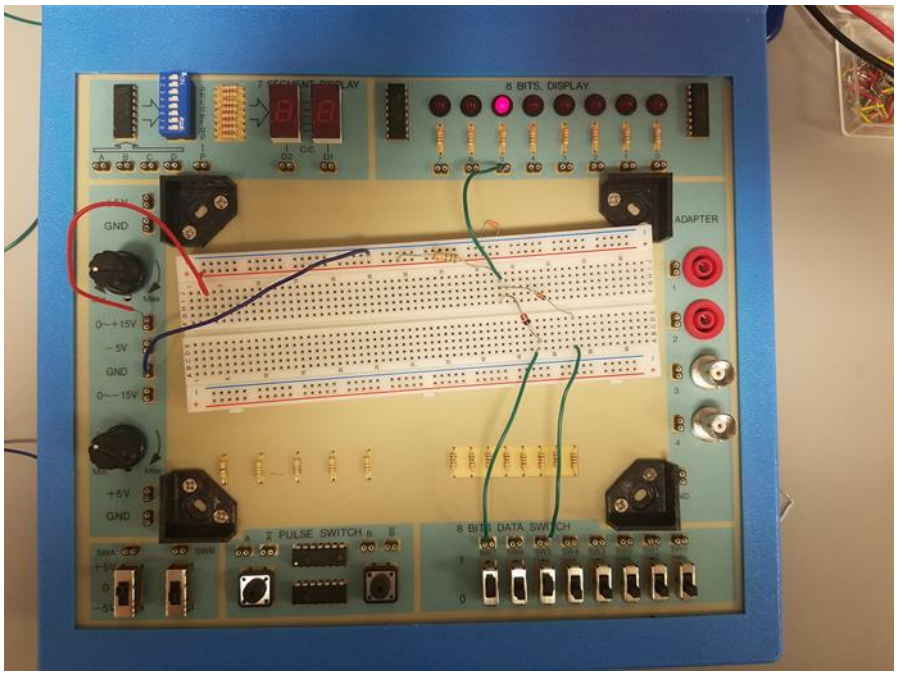

Figure 2B: Photo of AND Gate Breadboard

Summary:

The AND gate utilized diodes to run 2 wires from separate switches to converge at a single wire, connecting to an LED light, as shown in Figure 2B. This functions as an AND gate specifically because the diodes are facing the switches. The switches have power and ground supplied to them separate from the bread board, so if either one of them is switched off, it behaves as a connection to ground.

Part III: OR Gate

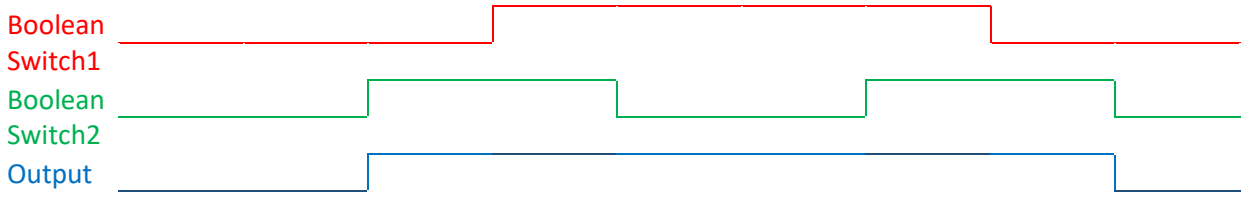

Figure 3A: Timing Diagram of the OR Gate

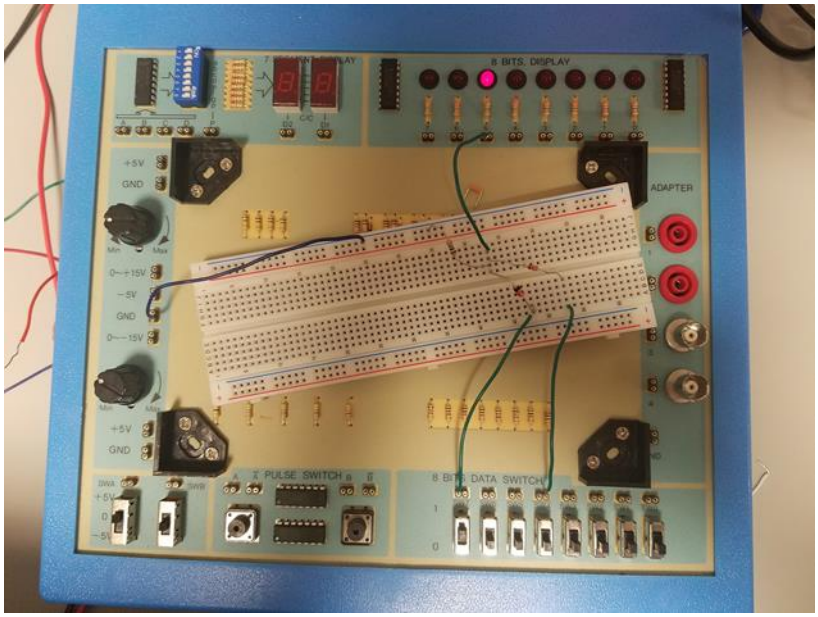

Figure 3B: Photo of OR Gate Breadboard

Summary:

Functions similarly to the AND gate, except that the diodes are now running from the switch to the breadboard (see Figure 3B). Because of this, the power provided by either switch powers the circuit, needing only one switch to be on.