605.611 - Foundations of Computer Architecture

Assignment 03

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Do all the following in Logisim. Problem 2 is extra credit.

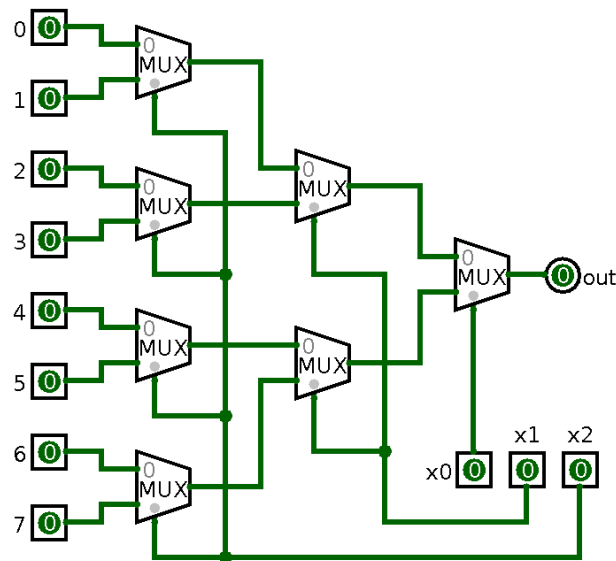1. Implement an 8-to-1 multiplexer using only 2-to-1 multiplexers.

Figure 1: An 8-to-1 Multiplexer Using 2-to-1 Multiplexers in Logisim

2. Implement a 16-to-4 encoder using only 8-to-3 encoders, a mux, and basic gates (AND, OR, and NOT).
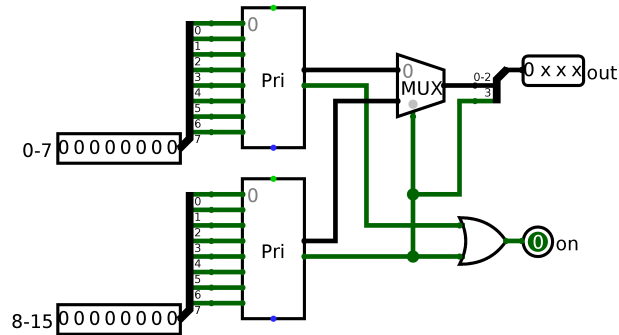

Figure 2: A 16-to-4 Encoder in Logisim

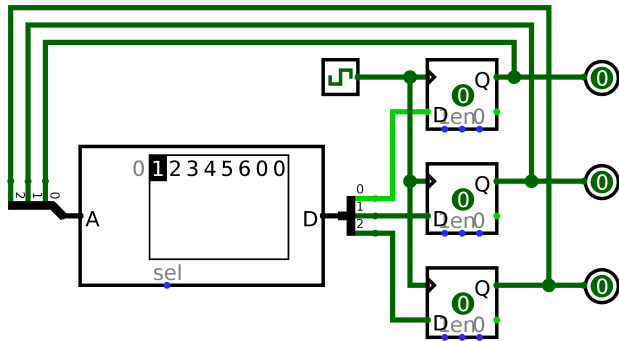3. Implement a mod 6 counter using a ROM memory.

Figure 3: A Mod 6 Counter Using A ROM Memory in Logisim

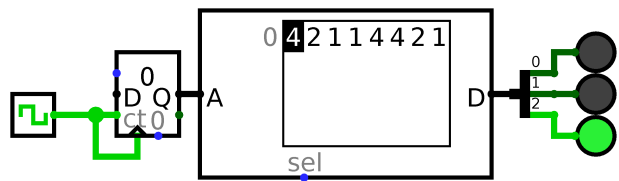4. Implement a stop light using a ROM memory.

Figure 4: A Stop Light Using A ROM Memory in Logisim

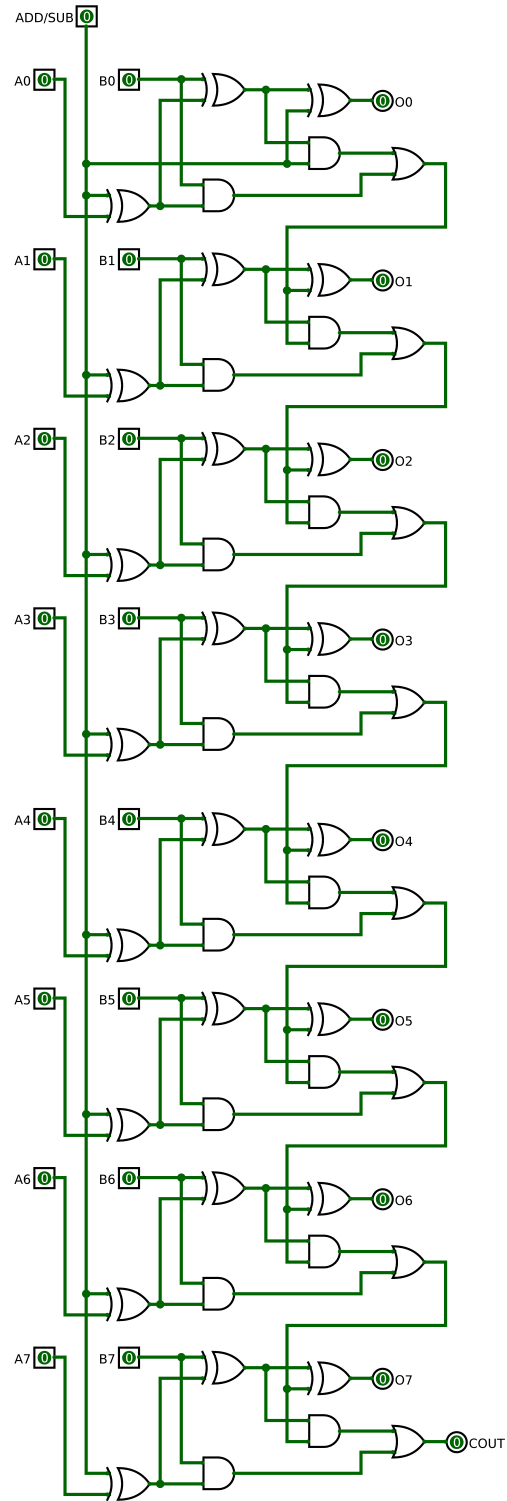5. Implement an 8-bit integer adder/subtracter using the circuit covered in class.

Figure 5: An 8-bit Integer Adder/Subtracter in Logisim