260 HW 2 Report

Summary:

I learned (from both YouTube and the lab) a lot about circuits and logic. I did a lot of research on adders and flip-flop gates (d-flip flops are what I used for my up/down adder). This combined with the knowledge I gathered on combinational circuits enhanced my understanding of binary signals and digital logic. Logisim was also a very useful tool in helping me visualize digital circuit design.

Learning Process:

I learned about Boolean algebra and created adders of my own within Logisim. The expression for addition can be translated into visual logic which is what the circuits were designed with. This adder design was then used (though altered to fit) for the up/down counter. I also learned about how to use flip-flop gates and how they work. They store information and then change based on the clock’s input. This was the backbone of the adder design I used. During my research I found some circuit diagrams that greatly helped me with my design. I made alterations such that the adder would work correctly as it needed changes.

Task Completion:

Task 1, 2, &3:

No questions to answer. These tasks are focused on familiarizing myself with binary, Logisim, and how to operate circuits within Logisim.

Task 4:

When connecting and changing inputs to the decoder I noticed that when I aligned my inputs up with the desired binary representation of a number it came through into the display. This means I only need to automate the counting and the decoder will display the correct value on the 7-segment display.

Task 5:

Designed the up down counter. Research was hard but laying out multiple paths for adding up and adding down (-1) was useful.

Task 6:

Added Clk, Reset, up/down input and tested my display. After some trial and error with getting the output of the up/down adder, I got the circuit to work perfectly.