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CPE 301-1001
Assignment #2
September 21, 2016

Assignment Description:

We will be learning about how to implement a decoder, a D-type latch, and a shift register today in lab. First we will be using a decoder, the D-type latch, and LEDs to find the truth table of the decoder being used. We will do this by setting the LEDs to be off by default, then connecting the LE pin of the D-type latch to a high current. Then once we have found the truth table we will tie LE to low and see what happens when we change the inputs of the decoder. We will then connect a button to the CLK pin of the shift register, and tie A, B, and CLR pins of the register to high. We will figure out why we had to do that, and derive the function(s) of the shift register by going through outputs 0-7 of the connected D-type latch and alternating A and B inputs of the register from hight to low.

Problems Encountered:

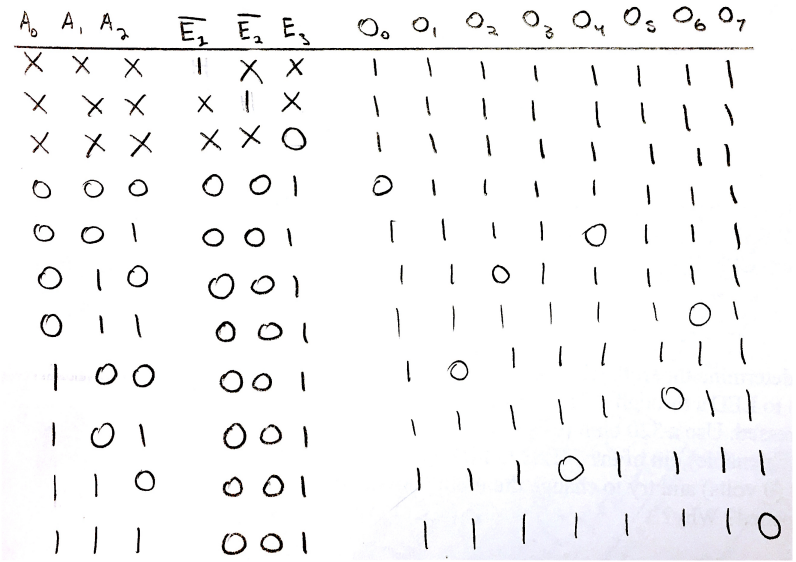
Most of the problems we encountered were simple misconnections on the breadboard with the wires. Also I had some problems getting used to using data sheets online. We also received an updated version of one of the data sheets during the lab which added a little to the confusion. This lab went smoothly overall and it provided a good refresher on how to look at data sheets.

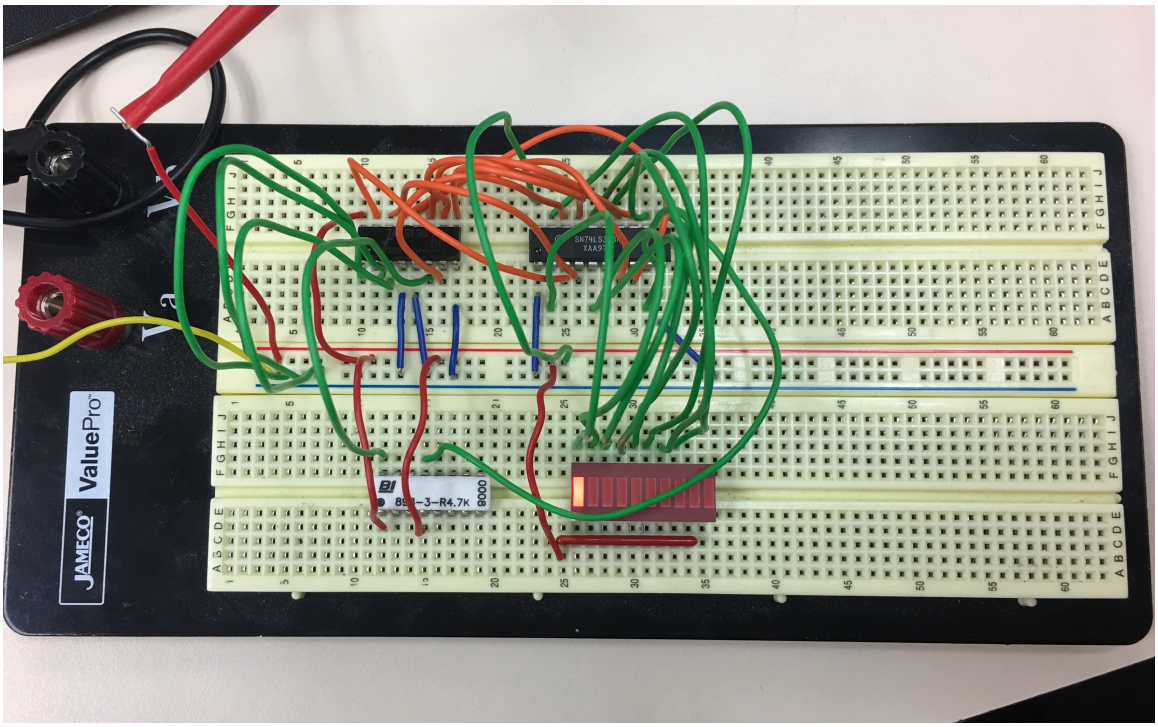
Lessons Learned:

My partner and I learned how to use the two new types of resistors we were given. I really like the new types we used as we only had to place one down and have several lines go in and out of it, which results in a more organized and visually pleasing flow of wires.

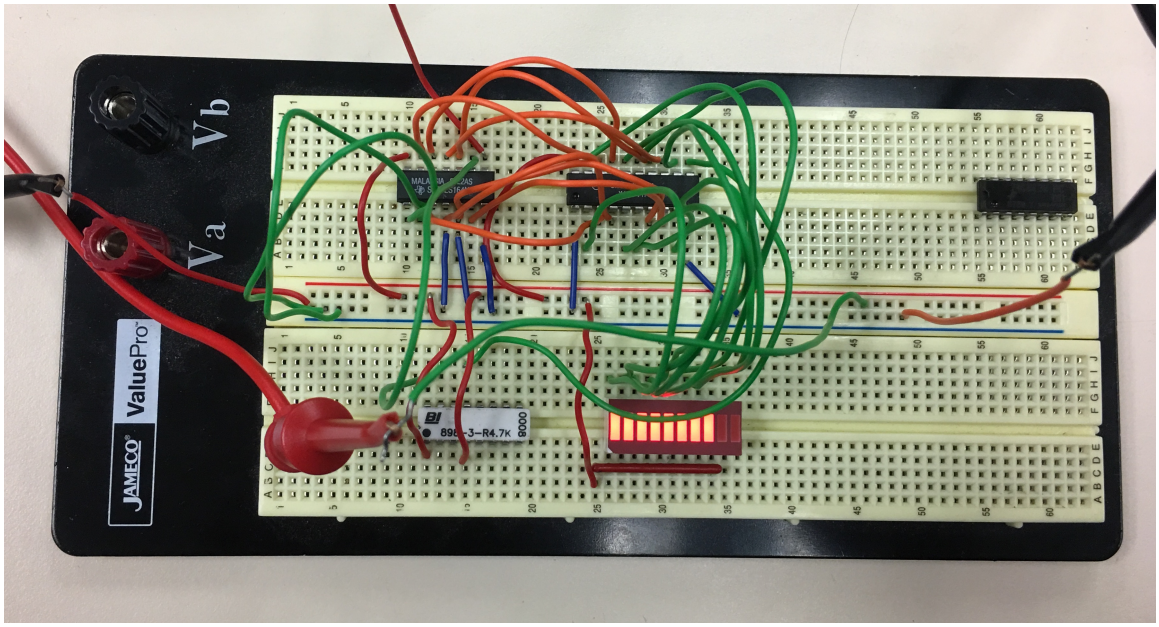
Description of Completed Lab:

1) In this first part of the lab we were supposed to determine the truth table of the 3-to-8 decoder by connecting its outputs to the linear LED bargraph through the octal D-latch. We did this by putting the current through a 320 ohm resistor to limit the current through the LED. The truth table for the 74ls138 decoder is shown to the left. As you can see, if the 3 enables are not set to their correct active levels, then every output is high, no matter the input. This finished breadboard is shown below, with one of the led segments on (at the time).





The image shown at the top of the next page depicts what occurred when we tied latch enable (LE) low and attempted to change the input combination for the decoder. All the connected LEDs stayed on.



2) In the second part of this lab we were to connect a switch to the clock input of the 74ls164 and tie both the A and B pins high. Then we had to tie the clear pin high, to clear the shift register. When both A and B are low, the display would fill up per the cycles of the function generator. It would then stay filled. If I unplugged A, nothing would happen. Once I set both to low, the display would empty. This is due to tri-state gates. One of the states is high-impedance.