ELEC 2210 LABORATORY REPORT COVER PAGE
Complete and attach this page to the front of your lab report.

Meeting # 2 Basic Digital Logic Circuits
Title of Lab Experiment

Student Name: Emerson, Gabriel, T
Name (Last, First, MI)

Student Email: gte0002
AU 7-character username

GTA: Paul Atilola
Name of your GTA

Section you are enrolled in: (Circle One): (1) 2 3 4 5 6 7 8

Date experiment performed (dd / mm / yy): 1/19/21

Date report submitted: (dd / mm / yy): 1/25/21

If you performed this experiment at a time other than your regularly scheduled section meeting:

Section # of the section you sat in on (Circle One): 1 2 3 4 5 6 7 8 Makeup

Name of the GTA who supervised your work: _____

I hereby certify that the contents of this report are true and complete to the best of my ability.
The lab work was performed by me exclusively, and this report was written by me exclusively.

Student signature

1/25/21
Date signed

Gabriel Emerson
Experiment 1: Basic Digital Logic Circuits
ELEC 2210
1/19/21

The objectives of this lab were to review basic digital logic circuits and breadboarding techniques, that will be useful for the rest of the semester. We also reviewed how to use NI Elvis workstations. The goals of this lab were to review logic gates, design basic multiplexers, and constructing and testing the design on a breadboard.

Step 1:

For the first part of the lab we connected three DIP switches and a resistor pack on a breadboard. These switches were also connected to LED's to view which way to switches were connected. We then verified that that each of the switches produces a high value when the switch is open (turning the LED on) and a low value when the switch is closed (turning the LED off). All connections were performed correctly so no problems were encountered. It took a moment to realize that the resistor pack had to be a certain way, or the circuit would not work. However, after seeing this, the rest of this step was no problem.

Step 2:

In the second section of the lab, the 7400 quad NAND gate was tested for functionality. We used two switches from the DIP switches to produce two input signals. We connected those signals to the inputs of the 7400quadNAND gates and the output was connected to an LED. The truth table of a single NAND gate (there are four contained within the 7400) is shown in Table 1. Each NAND gate within the 7400chipwas verified with the expected truth table. We verified the truth table for this gate by stepping through each of the four possible combinations of switch settings and recording the state of the LED.A circuit diagram showing this configuration is shown in Figure 1. The other three gates were tested similarly. All four NAND gates worked correctly coinciding with the NAND truth table outputs. It was very helpful to test all gates from the chip to actually see what is inside of it and how it works. We learned to be familiar with the pins and which ones are used for inputs and outputs. It was very helpful for the step 3 to produce the correct inputs and perform good connections.

Step 3:

In part three of the lab, the multiplexer design was implemented. We connected the four NAND gates of the 7400 IC to construct our multiplexer design from the Prelab. Three DIP switches were connected to the inputs of the multiplexer (A, B and S), and the output Z was connected

to LED 3. The truth table was verified, and it is shown below in Table 2. There were not any major errors, however, there was a small problem with some of the parts in the circuit were very touchy. If placed all the way down and correctly, I got the correct truth table.

Step 4:

In the last part of the lab, we used the ELVIS instrument launcher to produce digital signals with the Digital Writer and also to read the outputs with the Digital Reader. We reproduced the multiplexer truth table by manually manipulating the circuit inputs with the Digital Writer switches. The results were recorded by looking at the state of the circuit output shown in the Digital Reader. The truth table was verified, and it is shown below in Table 3. No problems were encountered since I had found the small error of old parts in the last section.

Overall, this lab was very helpful to review basic breadboarding circuits and how gates work. It was very interesting to see different ways to produce signals, either by connecting the switches in the breadboard or by manipulating the switches using ELVIS. I also learned that one small mistake of how exactly the part is seated on the breadboard could be what is making the entire circuit not function properly. The Lab Checklist is at the bottom of this document.

APPENDIX

Table 1.

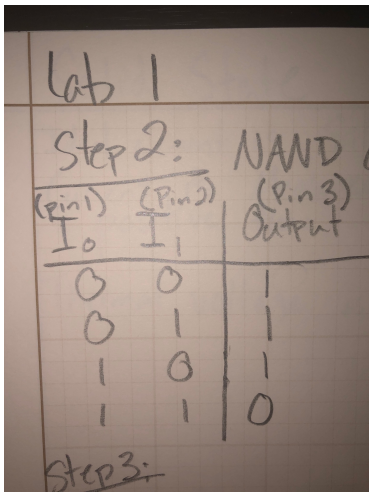


Figure 1.

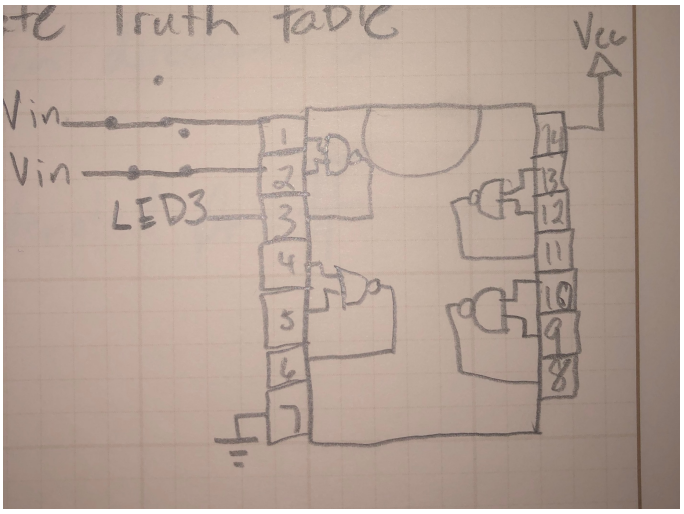


Table 2.

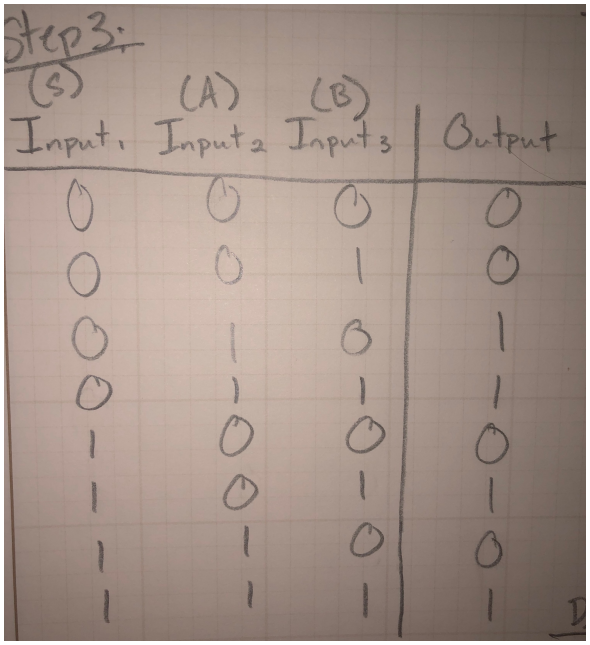
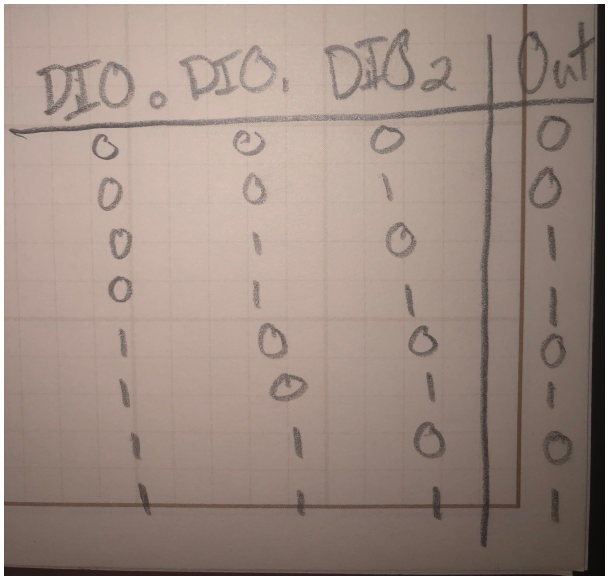


Table 3.



Lab Checklist

ELEC 2210 Lab Checklist

Student Name Gabriel Emerson

Meeting Date & Time T 11:00 GTA Name Paul Atilola

Section # 001 Station #_____

Meeting # & Title 1 Basic Digital Logic Circuits

Student Instructions: Fill in the items to be checked off by the GTA. When you are ready for checking off, notify the GTA. Include this sheet in your lab report.

GTA Instructions: Initial the student activities as requested in the experiment. Include comments as appropriate.

Part 1 DIP Switches GTA Initials P.O.A.

Comments (GTA / Student):

Part 2 NAND Gate truth table GTA Initials P.O.A.

Comments (GTA / Student):

Part 3 MultiPlexer GTA Initials P.O.A.

Comments (GTA / Student):

Part 4 Elvis Digital Reader/Writer GTA Initials P.O.A.

Comments (GTA / Student):

Cleanup Inspection GTA Initials P.O.A.