

Lab 0: Introduction to EEL3701C Lab

Overview

- Get to know your PI!
- Receive your DE-10 Lite and create a basic logic circuit.
- Receive your DAD3 (if necessary).
- Understand lab procedures and rules.

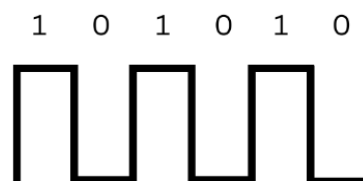
Introduction

Digital circuits are a foundational topic in electrical and computer engineering, and they are quite fascinating. They form the backbone of modern technology, from computers and smartphones to embedded systems and automation. Unlike analog circuits, digital circuits operate with discrete values (typically 0s and 1s). This makes them relatively easy to understand.

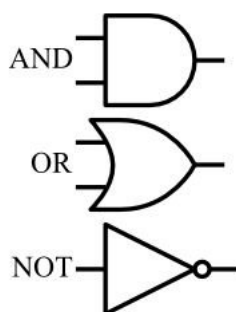
Analog



Digital



Digital logic gates are special electronic circuits that implement [Boolean Algebra](#), which is a branch of mathematics that deals with Boolean values: true (1) and false (0). They can be represented with symbols as shown below:



These are some basic logic gate symbols. You will observe some of the behavior of these gates during your lab section using **Logisim Evolution**.

Before you get started with this course, it is important that you understand the rules and guidelines of the labs. We will be using *GitHub Classroom* to manage your submissions throughout the semester. If you are unfamiliar with Git/GitHub, [take a look at this guide](#). Once you feel comfortable with this, proceed to the **Pre-Lab Procedure**.

Pre-Lab Procedure

1. Install [the lab software](#) on your machine. Do this **before** coming to the lab.
2. Read all the information in the [Lab Guidelines](#) document **before your lab**. You must answer all pre-lab questions **before** you enter your lab section.
3. Accept the Lab 0 assignment on GitHub [here](#). Clone the repository onto your machine.
4. Answer each question in the Pre-Lab Questions in the lab report template in the template folder.
5. Export your lab report as *lab0.pdf*, and place it in the root directory of the repository.
6. To complete your lab submission, submit the link to your repository on Canvas in the text submission.

Pre-Lab Questions

1. When are your pre-lab submissions due?
2. What, if any, is the late penalty for pre-lab submissions?
3. How are you to submit your pre-lab submissions?
4. If you miss your lab (or are more than 20 minutes late), can you make up the lab? Can you drop multiple labs?
5. Who should you contact regarding anything lab related?

In-Lab Procedure

1. Meet your PI and introduce yourself.
2. Show that Quartus, ModelSim, Logisim, Waveforms are installed on your computer.
3. Follow along as your PI creates basic logic circuits on Logisim. You will create one of your own in this session!
4. Follow along as your PI creates a basic circuit on a breadboard and probes it using the DAD board.
5. Receive your PLD (DE10-Lite) and ensure that it is functional before leaving the lab.

Rubric

Note	Points
Pre-Lab	
Answers all pre-lab questions correctly (4 points each)	20
Lab report is formatted properly	20
In-Lab	
Quartus/Modelsim/Logisim/Waveforms installed before coming to lab	20
Completed activities	40
Total	100

Appendix

Borrowing the DE10:

You will be checking out your DE10-Lite board for the semester. **You will return the following at the end of the semester:**

- DE10-Lite board
- Board bag
- USB Cable (type A male to type B male)

Throughout the semester, please handle it with care and transport it in a way that does not damage the unit. This means that the unit should always live in its bag until you need to use it and then return it to its bag. When you first plug the unit into the computer it will run its default program lighting all the 7-segment LED displays and the 10 LEDs.

Testing the board:

If you switch the far-right switch, it will change the default mode to use the IMU to light up the right strip of LEDs as you tilt the unit. If your unit is damaged in some way when it's checked out to you, please return it to your PI for another one.

Failure to return your hardware back to the lab before the final exam will result in an incomplete grade being put on your transcript.