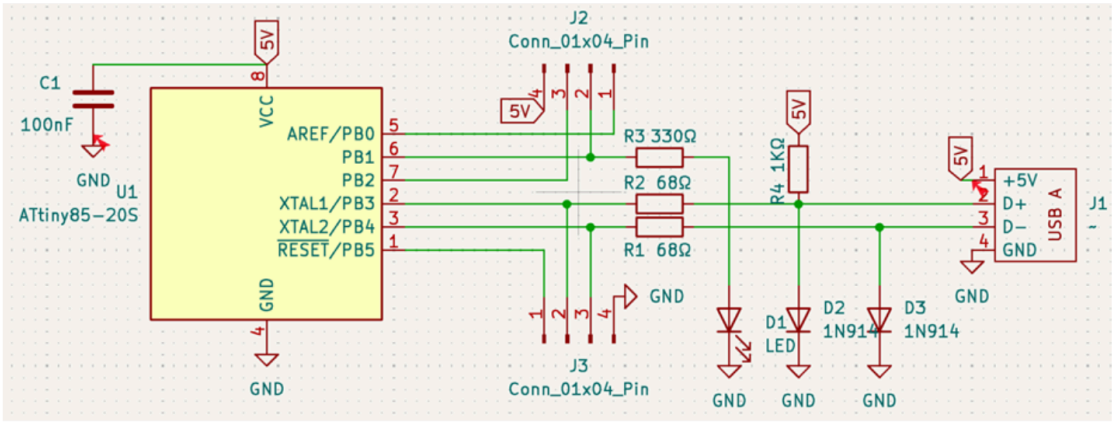
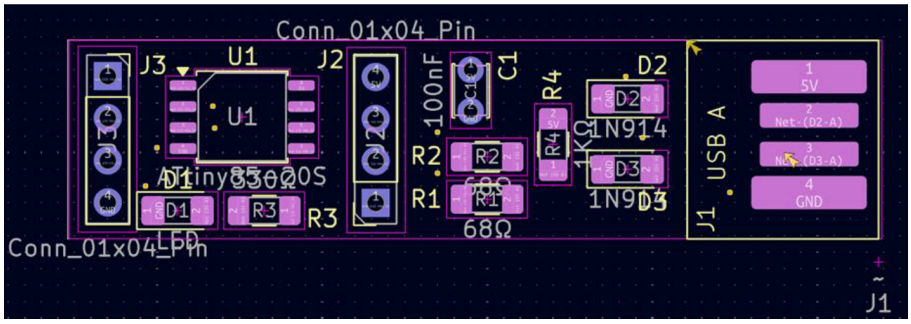
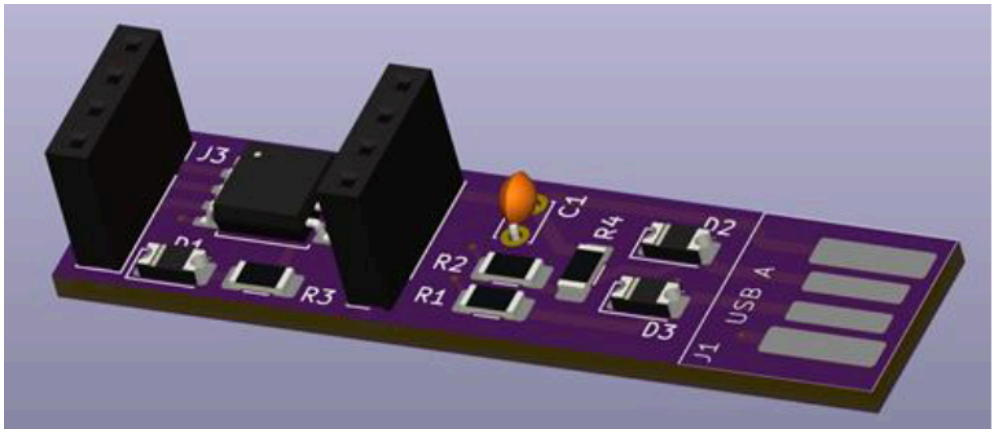
University School Projects:

IEEE Workshop: KiCad Voltage Regulator

I received practical experience in the use of KiCad for the design of printed circuit boards (PCBs). Besides that, the workshop was a full PCB design process including doing the schematics, making the component footprints, doing the layouts, and routing the traces. Eventually, I was able to finish a full PCB layout that was ready for getting fabricated, which made me have a great deal of understanding into the professional electronics design workflows and the developments of the practical circuits.

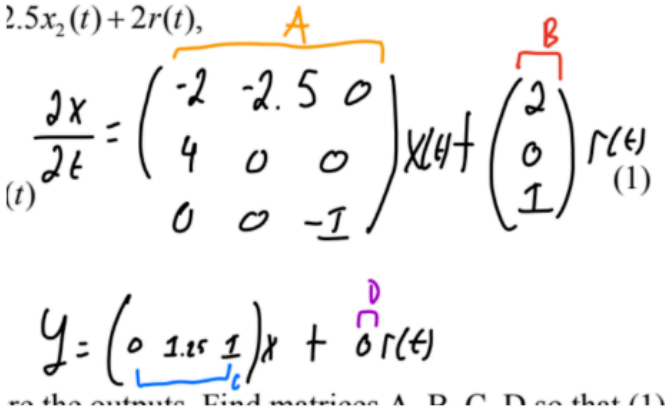






ECE 350 Principles of Automatic Control: Lab on Different Systems Give Same System Response

Utilized MATLAB and Simulink software for the representation and analysis of a dynamic control system with the State-Space representation methodology, including the (A, B, C, D matrices) and Transfer Functions. Such as the complex conjugate poles, and the stability analysis by poles/zeros maps shows the dynamics of the system. Created a minimal realization of the system to check the properties of the structure as well as the efficiency. The accuracy of the simulation was proved by the comparison of the step responses of the matrix-based model with the calculated transfer function model, thus confirming the same system behavior throughout the different simulation techniques. (matlab code not shown for space saving)



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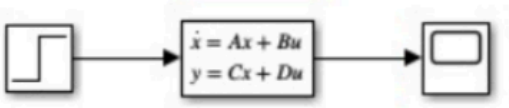

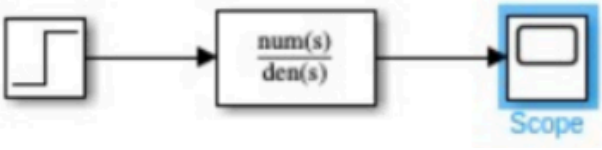


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Transfer Function Matrix G(s):
  tf with properties:

      Numerator: {[0 1 12.0000 20]}
    Denominator: {[1 3.0000 12 10]}
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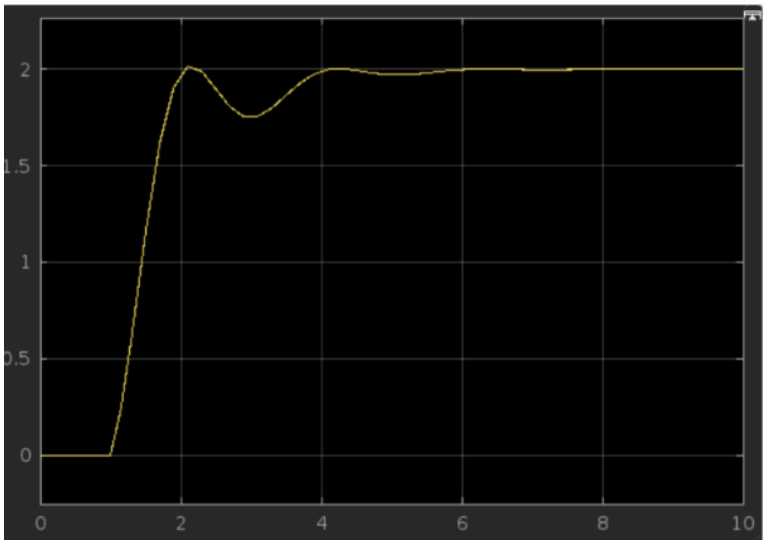
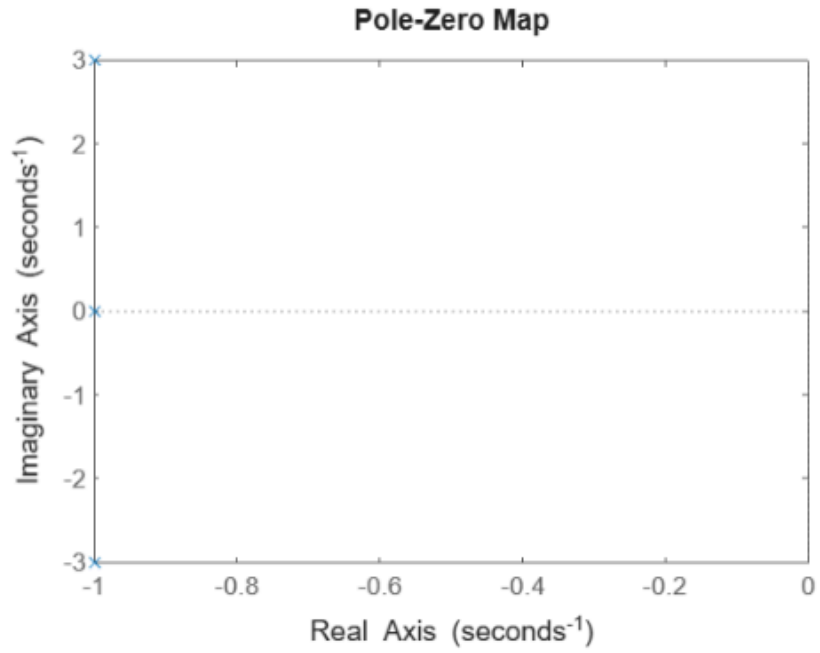
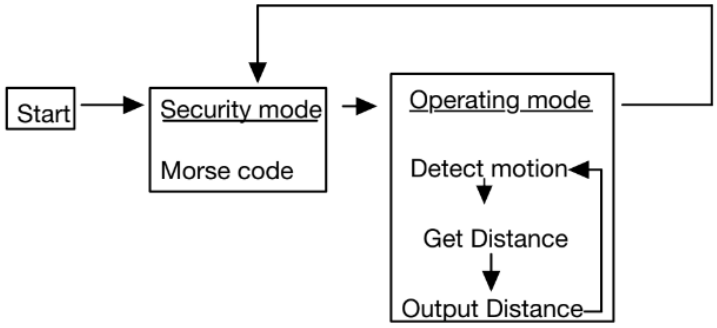




ECE 266 Introduction To Embedded Systems: final project smart ruler

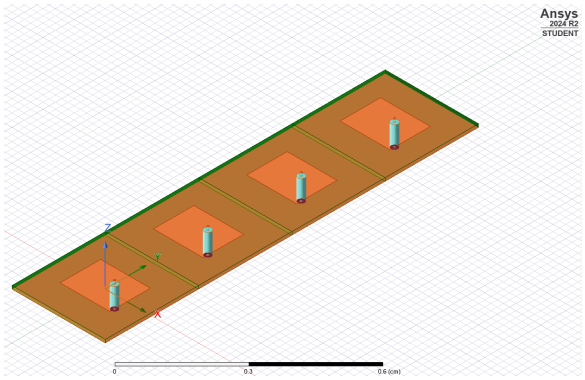
Designed and implemented a microcontroller-based ruler utilizing a motion sensor, 8-segment display, time capture, and push buttons. The system features a Morse code-based password, transitioning between security and operating modes. In operating mode, it detects objects, measures distance, and displays the output. Efficiently utilizes 262 KB of flash and 32,768 B of SRAM.

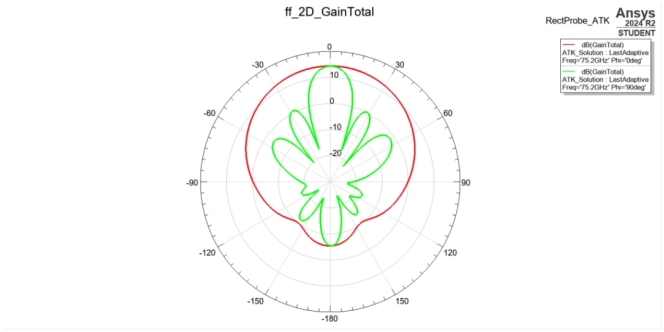


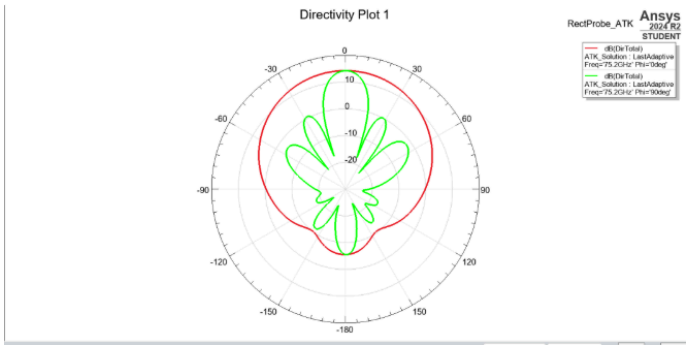
ECE 322 Intro to Electromagnetic and Application: Final Project(s):

Designed and simulated microstrip patch antennas, including a single patch and an array configuration. Utilized ACT extensions to input element dimensions without requiring full 3D modeling. Successfully generated and analyzed E-field and H-field plots through simulation.

(images shown is for the array configuration)



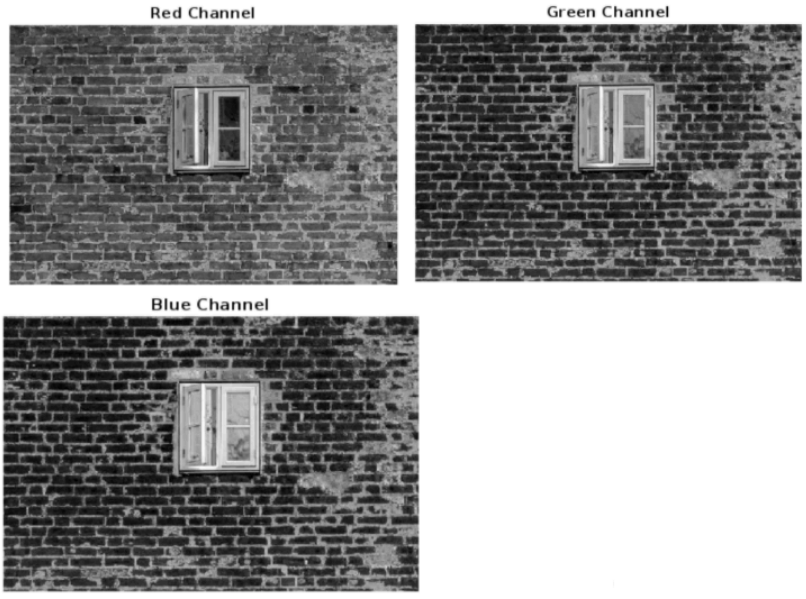




ECE 317 Digital Signal Processing 1: Image Processing

The basic image processing algorithms were the ones covered during the exploration, focusing on the separation of the color channels, the manipulation of the spatial resolution, and the analysis of the file formats. The color images were decomposed into three basic RGB channels to analyze the individual spectral contributions and matrix dimensions. The differences in storage between compressed (JPG) and uncompressed (BMP) formats were examined to gain a better understanding of data efficiency. The spatial decimation algorithms were implemented to downsample the images via horizontal and vertical means, matrix dimensions were effectively reduced, and the loss of visual detail was being monitored as a result.

The interpolation techniques were applied to upsample the modified images, where it was shown that although the original spatial dimensions could be restored, the high-frequency details that were lost during downsampling could not be recovered which led to a smoothed approximation of the original input.



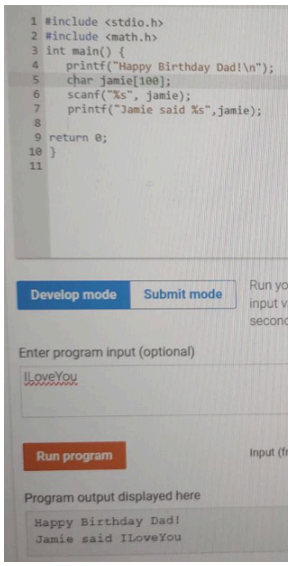
ECE 333 Computer Communication Networks 1- Send Email through Python Code

As part of ECE 333 Project 4, I designed and implemented a Python-based email client that utilized the SMTP for sending emails. Gmail's SMTP server was configured to allow a socket connection, thus providing the means to communicate securely through TLS encryption. The next step consisted of logging in the user by performing base64-encoded authentication with the AUTH PLAIN method. Once authentication was successful, the program not only sent an email message to the specified recipient but also interacted with the SMTP server through the standard responses that are processed during the whole transaction. This

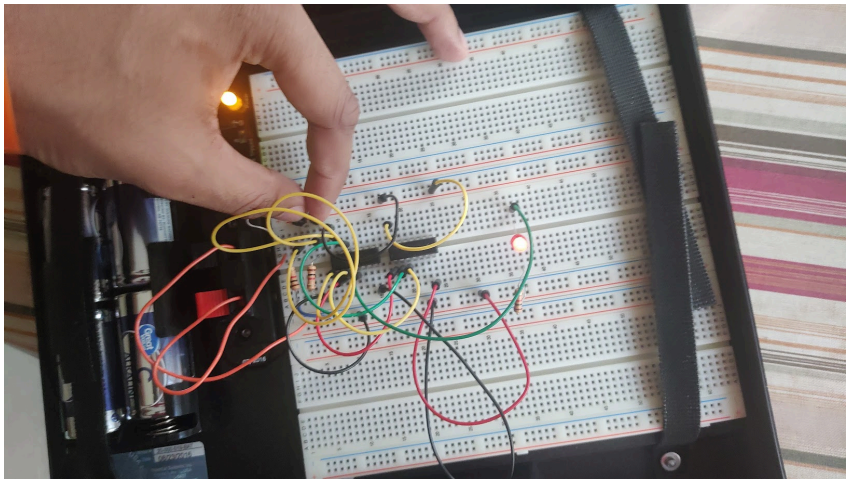
entire project broadened my skills and knowledge in network programming, socket communication, and email protocol implementation, while also showing how secure data transmission works in real-world applications. (code not shown for space saving)

PERSONAL PROJECTS IN COLLEGE:

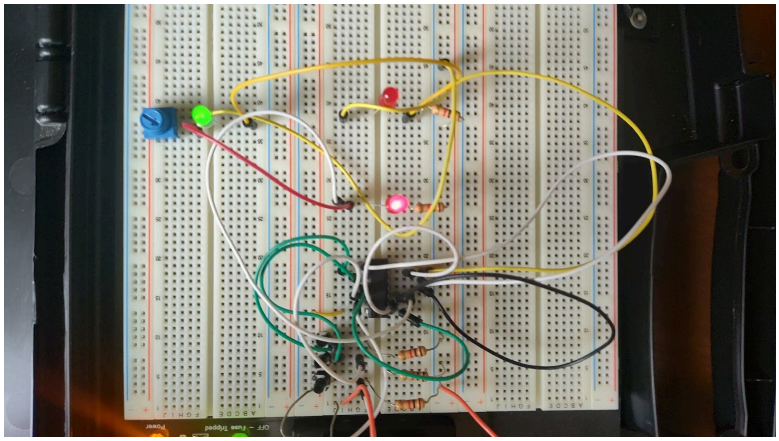
Simple Code To Wish Happy Birthday To My Dad in C language



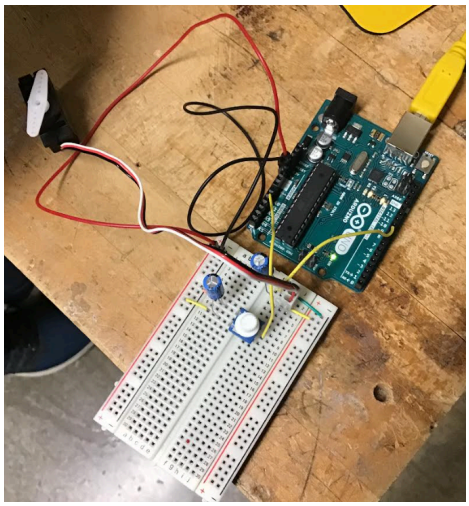
Hardware Demonstration of Demorgan's Theorem (Logic: ab vs !(!a+!b))



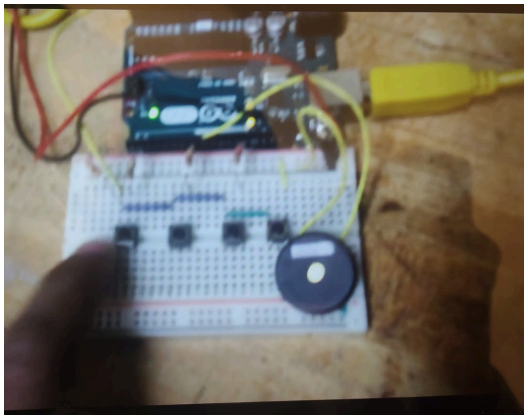
Sr latch with enable connected to potometer



High School- Arduino Projects:

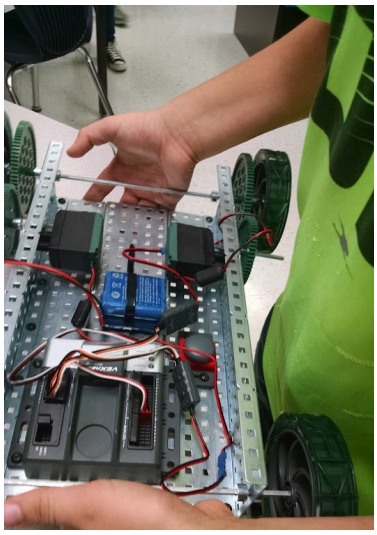


Following the instructions given in the code and the circuit diagram, I put together the circuit and uploaded the program via the Arduino IDE. The system is able to control the motor's movement according to the potentiometer input, illustrating the use of analog input for motion control.



Following the provided schematic and code, I assembled the circuit and ran the program on the Arduino IDE. The purpose of the circuit was to produce various musical tones for different button inputs as a demonstration of interactive audio feedback in embedded programming.

Middle School Project- Race Car:



A race car was built for an interstudent competition through a design and assembly process. Teamwork with fellow students and the teacher took place to create the timing of the motors, control the speed of the wheels, and optimize the gear ratios to improve the performance and efficiency.