

READ ME:

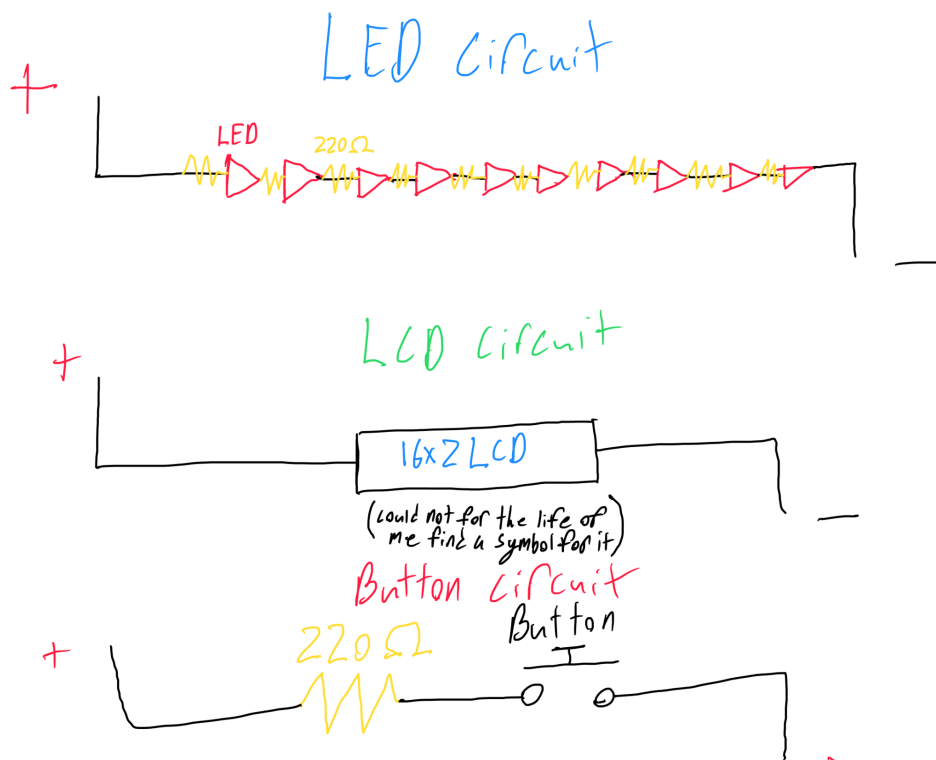
### Motivation:

My motivation for this project was to make something quite festive. I very much knew I wanted to work with LED's from the start because I always thought coding lights was really trivial and exciting. I was inspired by my own RGB light strips I've bought off Amazon that have all the crazy lighting effects and I wanted to at least get a taste of how to do that. The next part was trying to come up with the other components to use along with the LED's. I figured the LCD display would pair quite nicely with the LED's and make it feel kind of intricate and then I really wanted some way to interact with the project so I simply added a button to it that controls the lights.

### Plans:

I first wanted to tackle the hardest part which was the lights. I only had so many supplies so I had to be careful with how many lights I wanted to include so I would have enough wires for all the other components. Once I had all the lights somewhat put together and coded, I moved onto the LCD display which was quite easy to figure out. Lastly, was the input. Initially I actually wanted to use the IR remote but unfortunately after hours of fidgeting with it, I could not manage to get it to work with my project so instead I switched it out for a simple button to start the sequence of effects for the lights. Then after I finally had everything coded and working, I decided I wanted to build a "nice" box that I could mount all the components in and hide all the wires. I made the box out of foam board and cut out holes for each of the LED's and components and arranged them to look like a christmas tree that will light up sequentially.

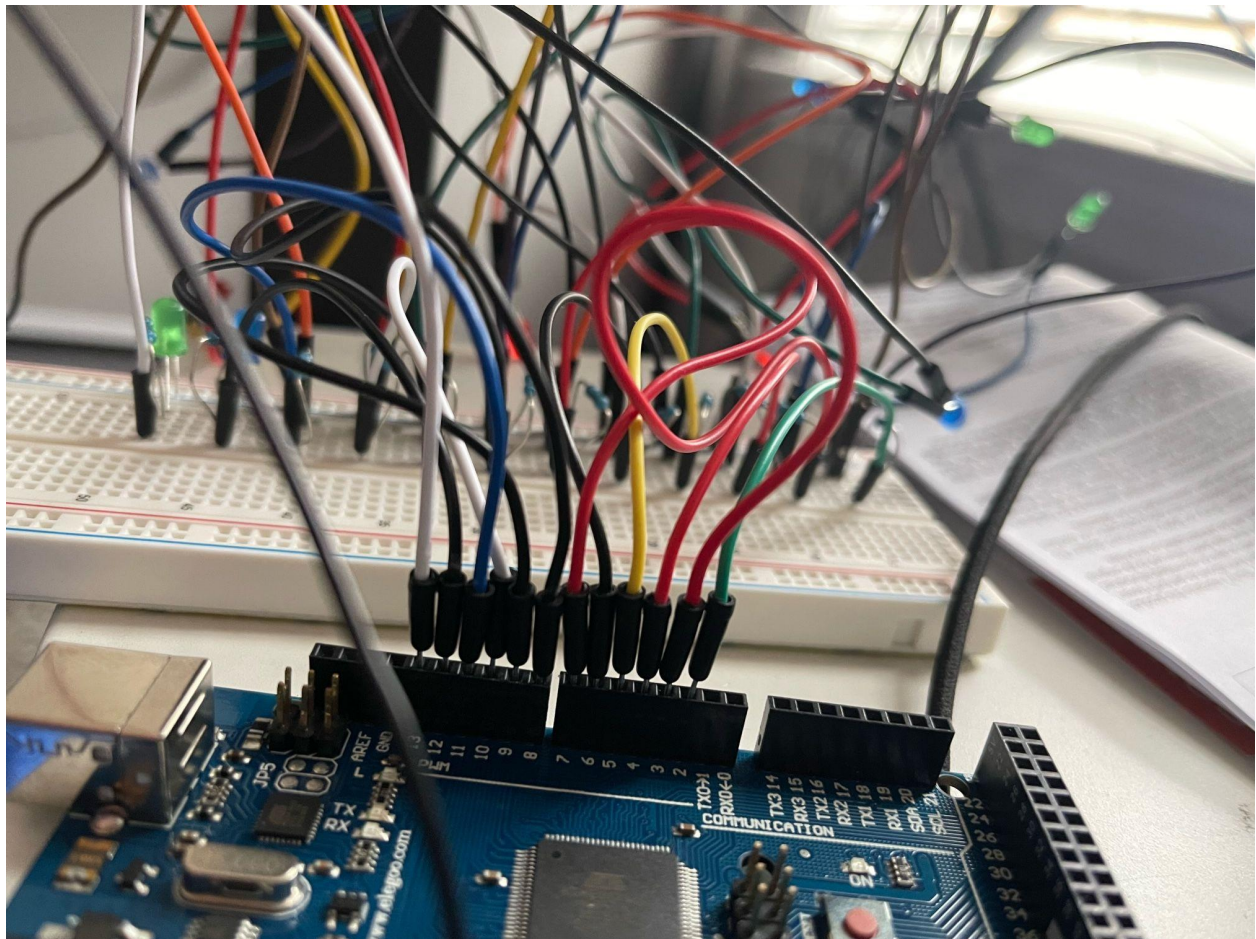
### Circuit:



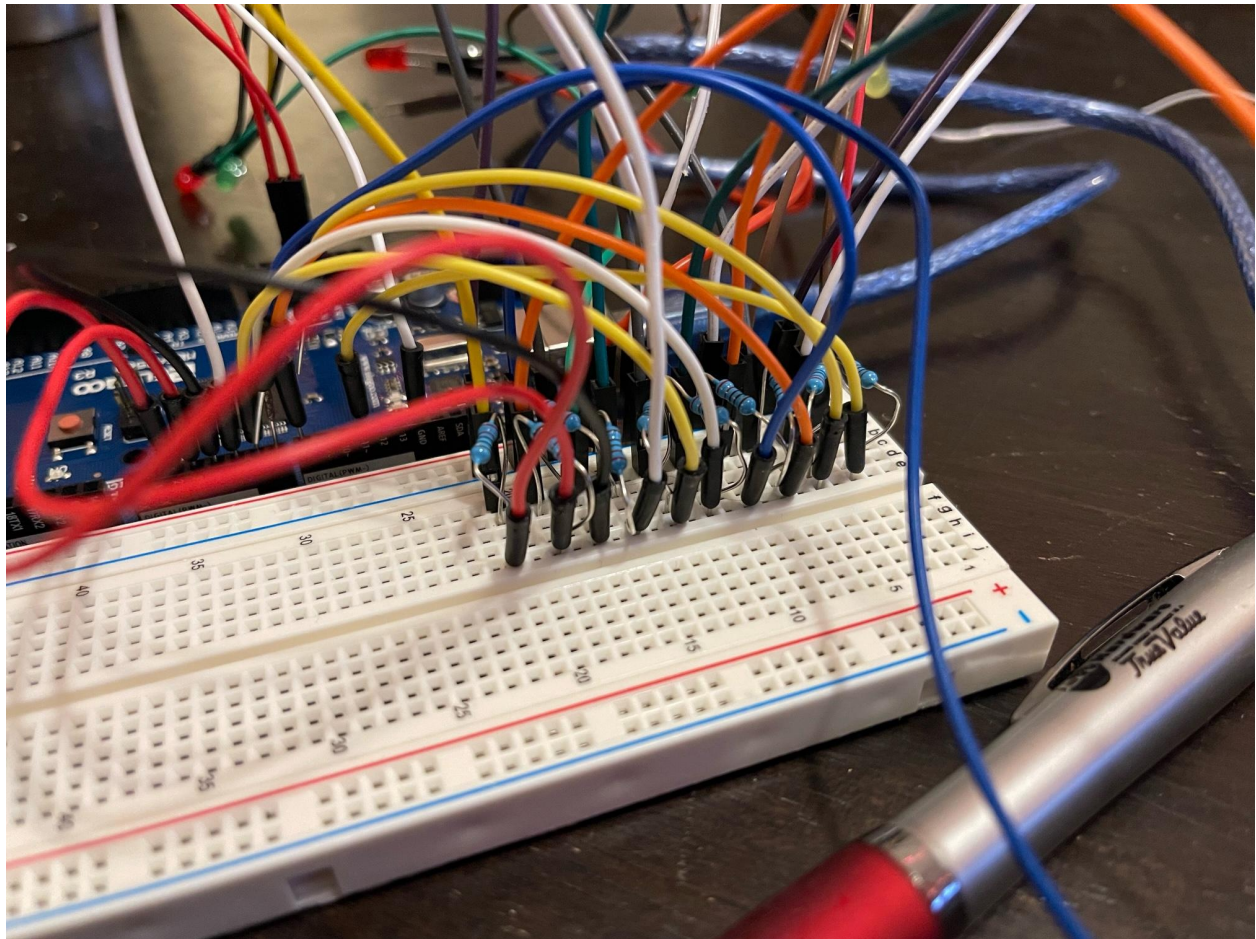
The power flow is quite intricate within my project. First for the LED's, I have each LED hooked up to a specific pin for power which also runs through a 220 ohm resistor and is grounded on the breadboard. Next, the LCD display connected right into the arduino with each of its 16 pins located on the LCD display being plugged into their respective pins on the arduino. The LCD display takes both the 3.3V power as well as the 5V power and is grounded three times on the arduino. The button is quite simple with a 220 ohm resistor in the middle of the circuit before the power reaches the button to power it. It is grounded to the breadboard.

### **Photo Steps:**

This is a photo of the first time I set up the LEDs. It was quite a mess and it was spread across the entire motherboard with 12 lights.

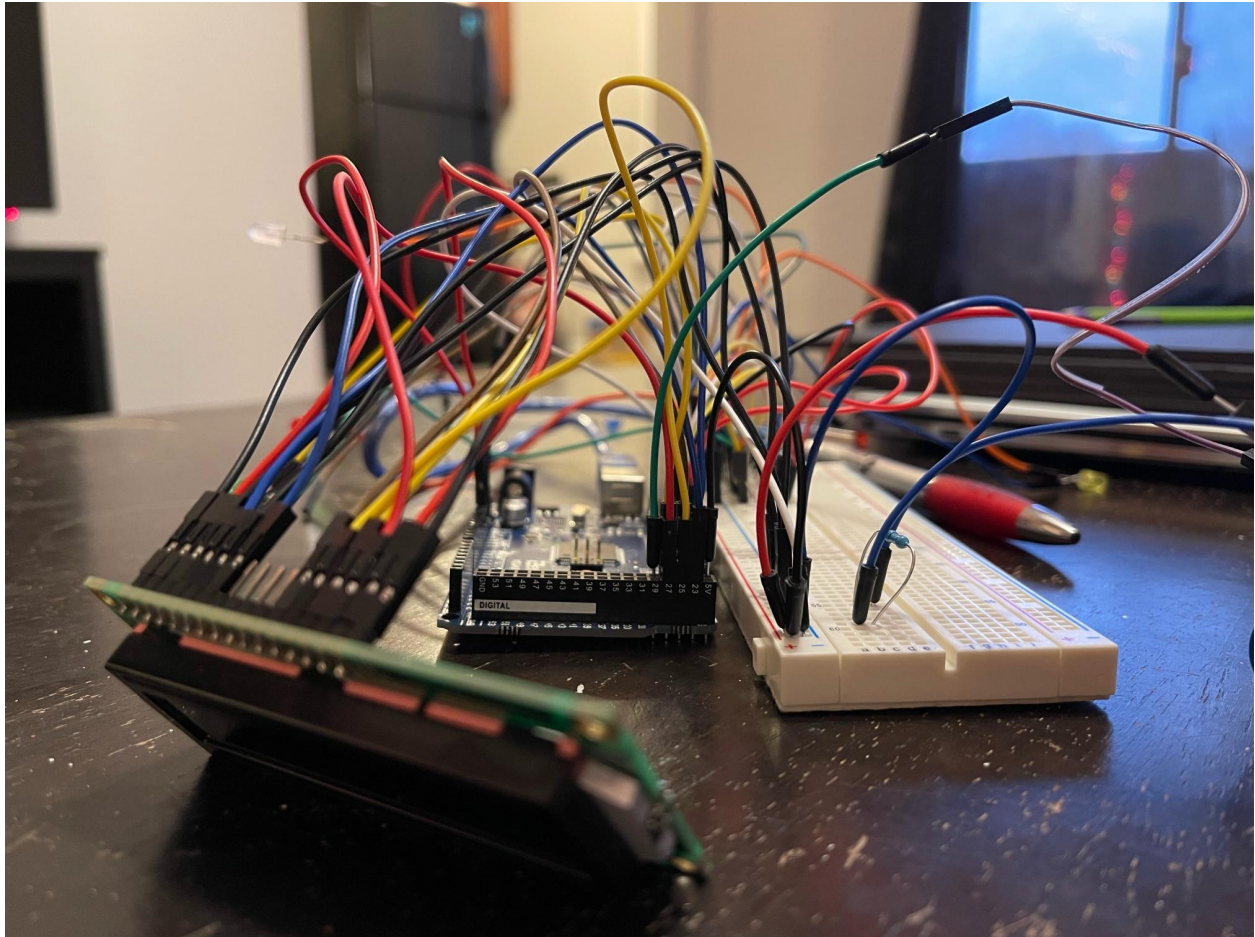


This photo I consolidated all the LEDs in the top right corner of the breadboard to leave room for everything else and look a lot cleaner.

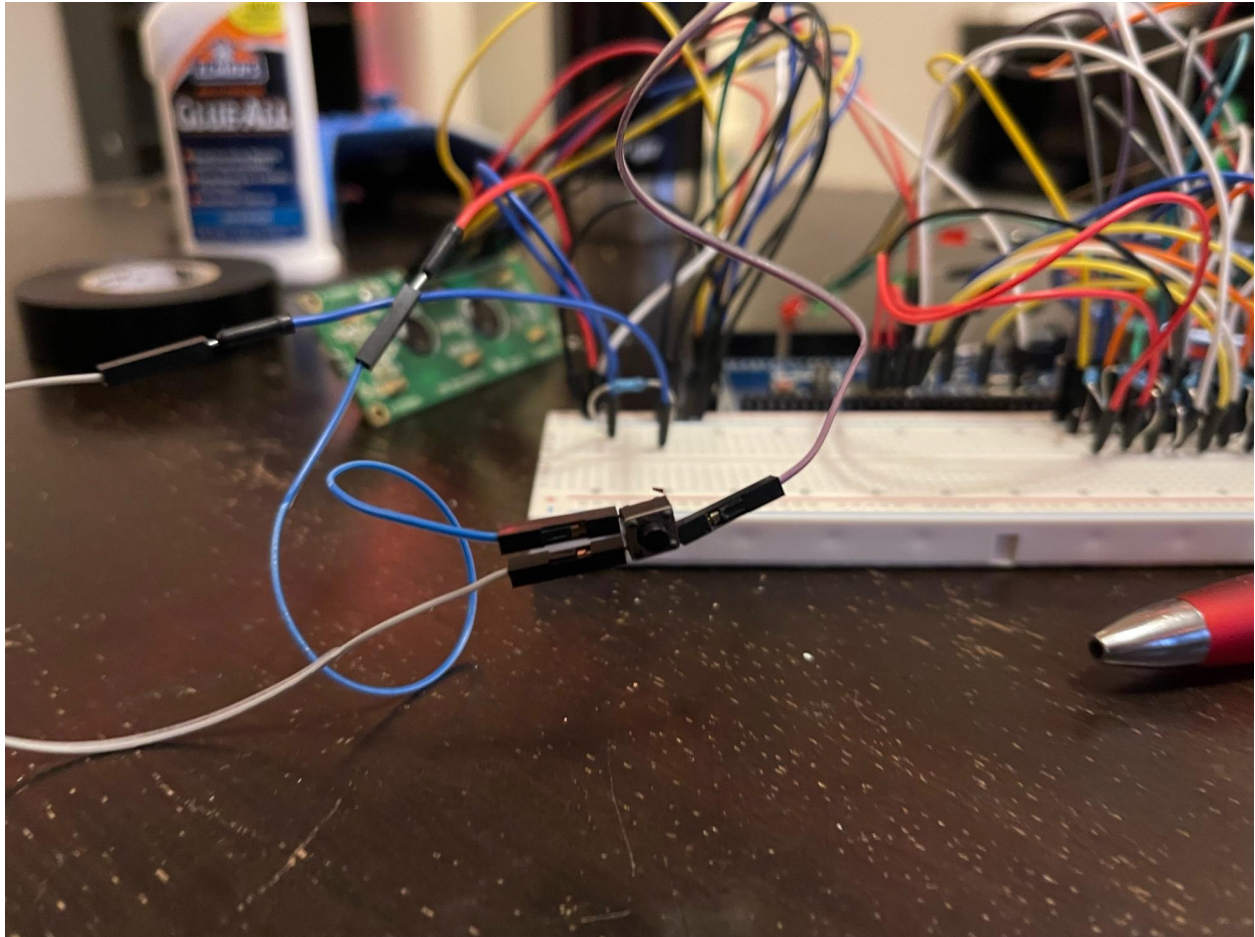




This is a photo of when I connected the LCD display to the system along with the LEDs seen in the background



The last component was the button and it was pretty easy to connect. Nothing too crazy.



### **Video Documentation:**

Link to video of project working:

<https://drive.google.com/file/d/1IXTDQJGt9Xn-h7ADOZR2abFfMvEaSO06/view?usp=sharing>

### **Instructions:**

My project is thankfully quite simple and user friendly!

Step 1: Plug in the Christmas tree. In the back of the box, a USB cord is present that can be plugged into any block to power the project.

Step 2: Press the button in the top right corner and watch the light show!

Step 3: When the lights turn off, you can press the button again to watch the lights.

Step 4: Unplug from power when you're done.

### **Finished Code:**

[https://github.com/DavidJakacky/NMD-211/blob/b3a39dc16ff90e27c89f69ff3747f006ec52bf31/David\\_Jakacky\\_Final\\_Project.zip](https://github.com/DavidJakacky/NMD-211/blob/b3a39dc16ff90e27c89f69ff3747f006ec52bf31/David_Jakacky_Final_Project.zip)

### **Reflection:**

This project was quite fun for me! I very much enjoyed coding the lights and really seeing my project come to life. Although it may be quite simple, it's gratifying to say that I made it myself and I understand exactly how it was built and coded. I think the sequential lighting effects are very cool especially when they are in the shape of a christmas tree. I think the LCD screen really adds a nice touch to the lights as it displays Merry Christmas as the lights flash and also tells the user what to do; Press the button. The button was very hard to actually wire off of the breadboard because there were no wires that would grab onto the super small legs of the button so I ended up having to glue wires onto it and overall the button does not look great but works perfectly. I was initially hoping to use the IR remote to control the lights but I simply could not get it to work between not being able to find the correct library to use for each tutorial and getting my lights to sync to multiple inputs on the remote. So instead I opted for a simple button which honestly makes it a lot more simplistic. My box is quite nice and hides absolutely everything except what I want the user to see which I love but I just wish it was built a little bit better. I didn't realize that I needed a hobby knife to cut the foam board without messing it up so it is quite jagged so I would certainly redo that in the future. I would also most definitely solder all my wires to their components and the board because there are times where a wire will slip off an LED and I would have to take the box apart to fix it. I learned that the coding for the arduino really isn't much different than what processing was for me. I always looked at it as quite daunting with new keywords but it definitely is not too hard to pick up which was a pleasant surprise. Overall, I very much enjoyed the project and I'm proud of what I came up with!

### **Helpful Tutorials:**

<https://mrelectrouino.blogspot.com/2019/05/12-led-chaser-using-arduino-uno-7-effect.html>

<https://create.arduino.cc/projecthub/najad/interfacing-lcd1602-with-arduino-764ec4>

<https://www.arduino.cc/en/Tutorial/BuiltInExamples/Button>