Michelle D. Davies

THE MOOD LIGHTS PROJECT

Color Decomposition and Random Functions

Documentation

OBJECTIVES

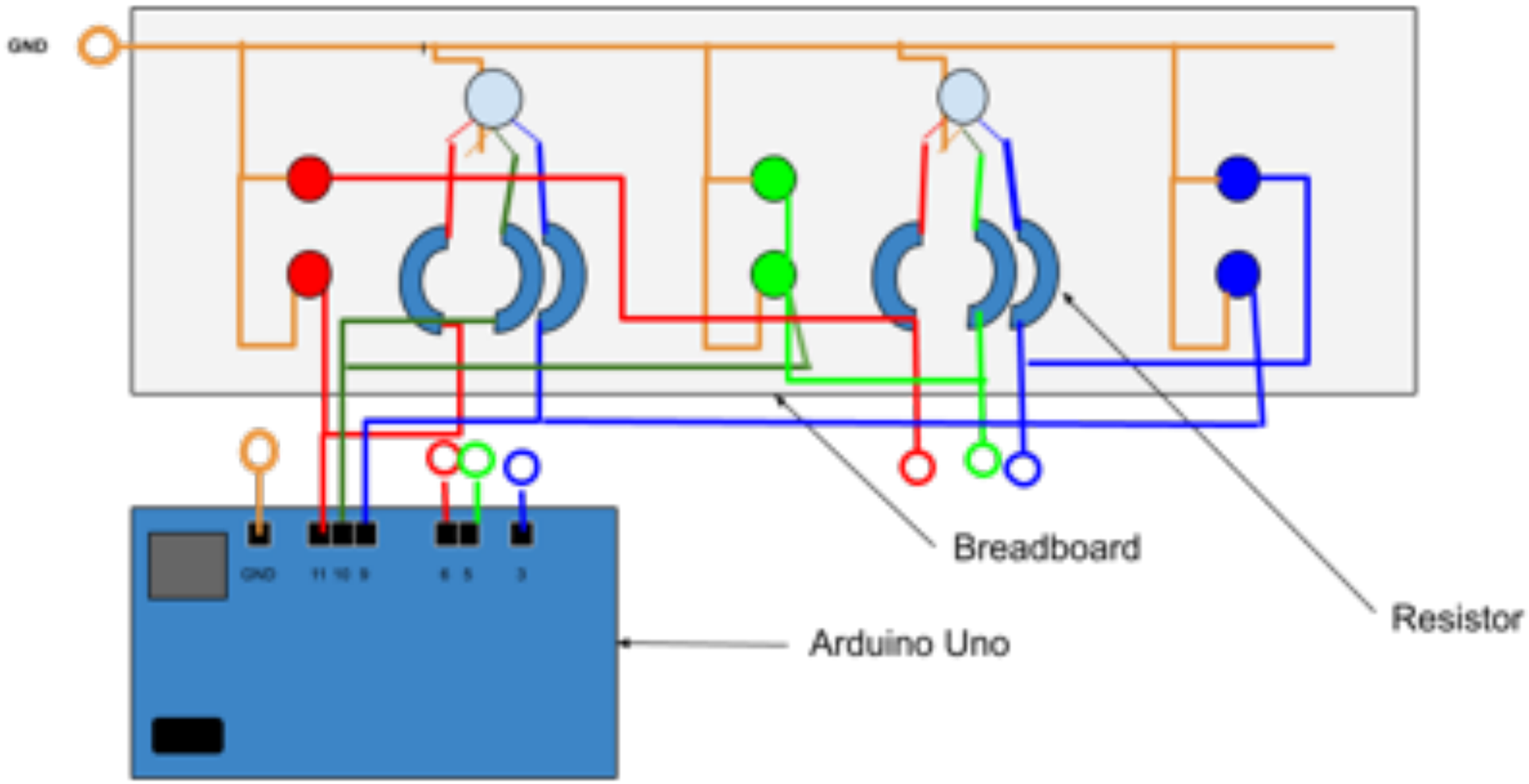
- **Implement a system that uses Analog rather than Digital data to control the lighting of the LEDs.**
- **Implement a circuit with RGB LEDs to change colors, and individual LEDs to provide a qualitative breakdown of the colors being displayed on the RGB LEDs.**
- **Use the random int function in C++ to determine colors that the RGB LEDs will display.**
- **Parse through the RGB values or pixels in any given photo and output that data on this circuit.**

For this project, I chose to adapt the standard RGB light project to explore color decomposition and and the use of random functions to determine a color value for the lights. I selected this project to try out because an interest that I have in graphic and 3D designs. Colors are an integral part of what we see, especially what we *like to see*.

In a world that Is becoming increasingly photogenic, having "the perfect photo" is largely dependent on its visual appeal. This visual appeal is influenced by the symmetry of that photo, and the color scheme of it. This project addresses that color scheme criteria by analyzing and displaying the RGB values of the color data it is given.

In aiming for this original goal of the project, I came across another interesting phenomenon, one that applies to all coding languages, that I wanted to explore a bit more: random number generators. As I looked at the colors that were being generated thanks to the random number function, I noticed a pattern in the colors that I saw in my circuit. This inspired me to track the colors that are being generated, and then from there, determine the numbers (constraint: between 0 and 255) that are being generated.

Look through the project page gallery to see different components of the project as well as the end result!



This is a digital drawing that shows the schematic of the circuit that I built for this project, with all components labeled. © Michelle D. Davies, The Mood Lights Project, New York, NY, March 30th, 2020. https://www.michelledominiquedavies.info/.

For the circuits, the components that I have in there are: 2 RGB LED lights, 2 red LED lights, 2 green LEDs, 2 blue LEDs, 6 resistors, and a lot of wires. All of the lights are connected in parallel—-see the diagram (above) for the layout of the circuit that I put together. I built the circuit based on this plan.

An important point to note is that the pins that I connected the wires to were specifically chosen. These 6 pins (3, 5, 6, 8, 10, 11) serve as both digital and analog pins on an Arduino. Since a major part of this project is that the brightness is determined by the RGB values the project inputs, I used Analog, hence the pins chosen.

CODE IMPLEMENTATION

For my code, the main things that I thought about were:

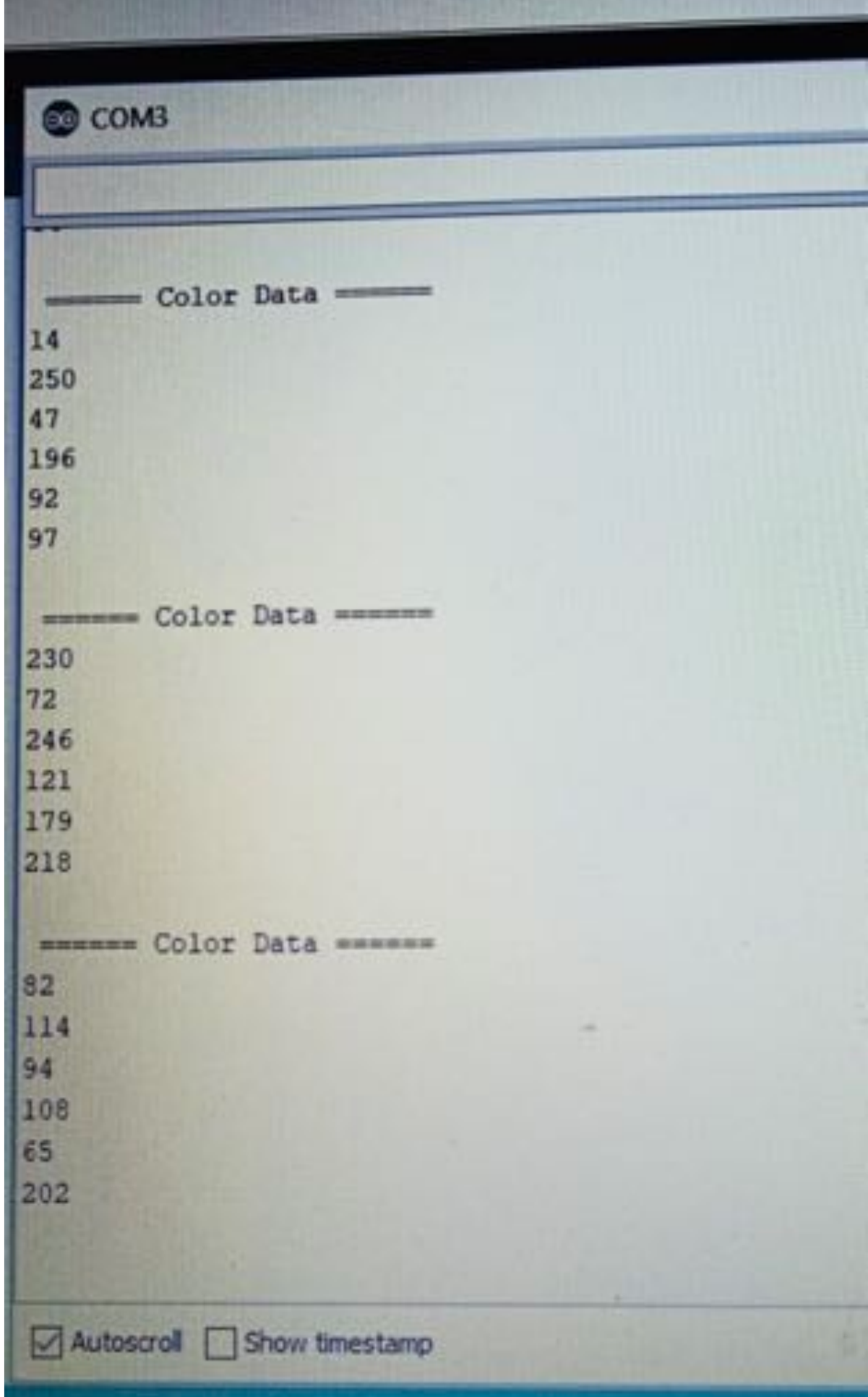
1. *How to determine the colors that will be broken up into their R, G and B values.*

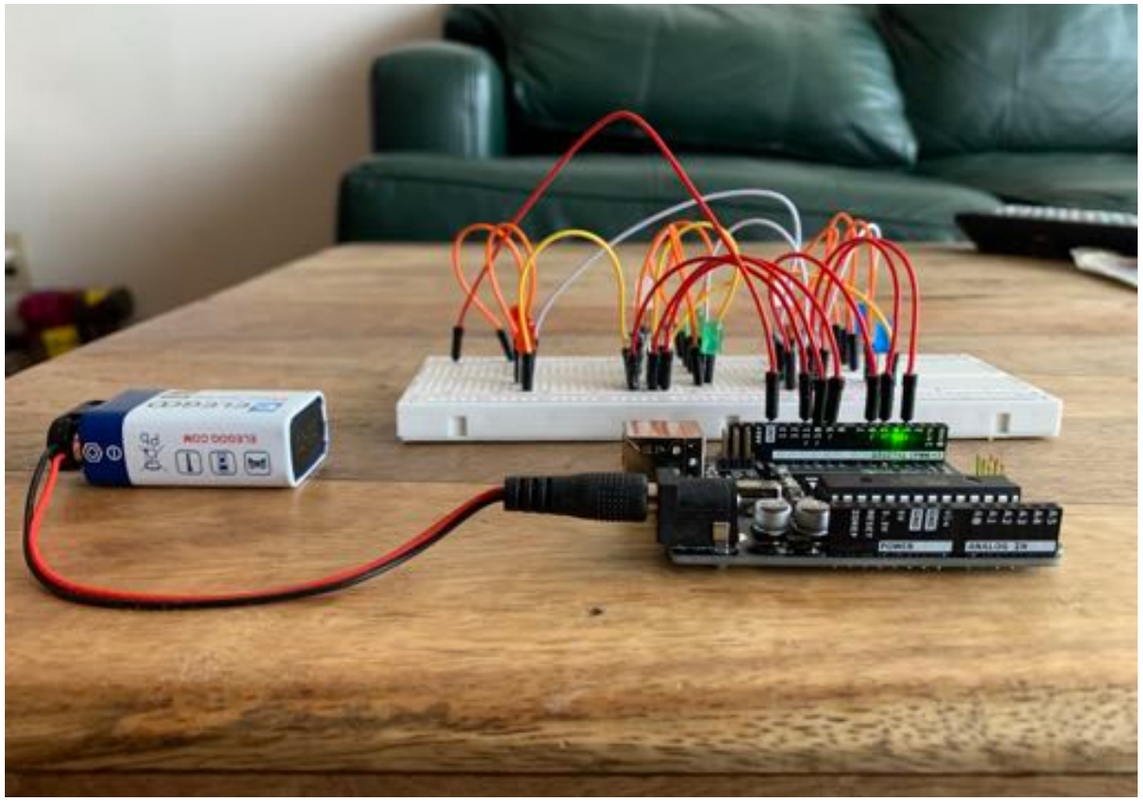
2. *How to verify the qualitative results for the colors using quantitative data,*

3. *How to collect enough data on the colors being generated to look at the trends in the RGB values.*

For each of these design considerations, I looked into a solution that could supplement the project and accomplish that consideration.

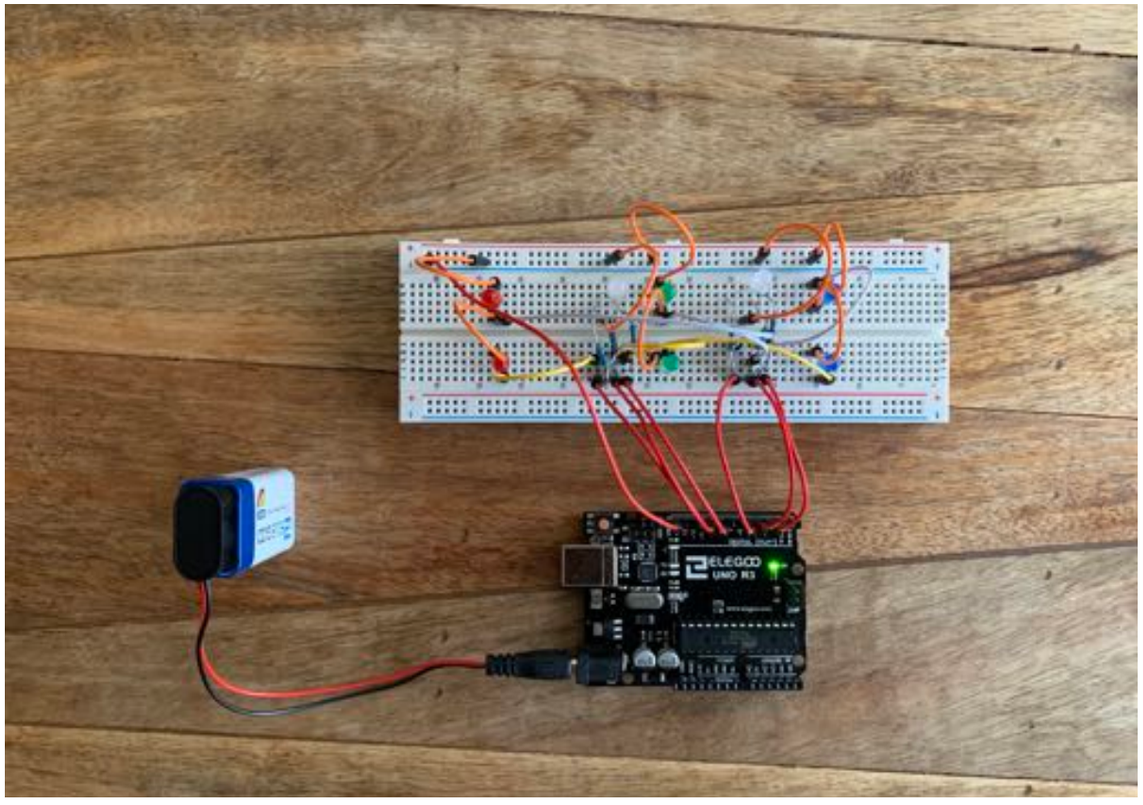
For the second and third considerations, the solution I thought about addresses both. Besides screen-printing the values, I created a ***struct*** data structure to store all of the random RGB values that are generated, so that I can not only access past colors, but I can analyze the numbers.





NEXT STEPS

One next step that I would consider taking with this project is creating a color history function and a color control function, which would be accessed with a buttons and a joystick.



For color control, I would use the position input of a joystick to allow users to move around the color wheel and display those colors on the board.

For color history, I would have buttons to access the list of colors (RBG triples) and scroll through.