



Smart Traffic Light

Senior Design Presentation

Kelsey Duke

Christopher Buck

Johnny Lawson

Team Members

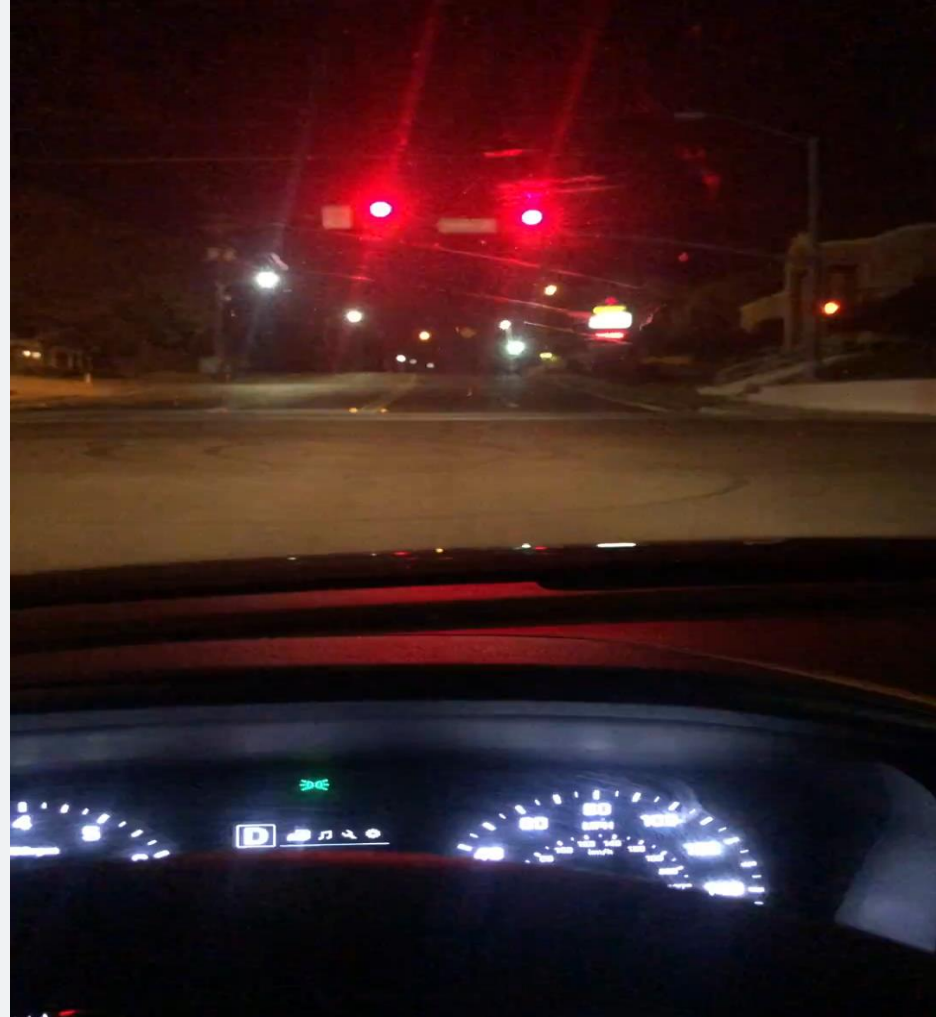
- Kelsey Duke - Electrical Engineer
- Johnny Lawson - Electrical Engineer
- Christopher Buck - Computer Engineer / Computer Science

Overview

- The general idea of this project is to create a smart, density-based traffic system that will always update states to traffic lights from IR sensor data. The states of the lights will be determined by the detection of a car by the IR sensor and how many vehicles are detected from the sensors.
- Reduction of Traffic
- Increase in Traffic Safety

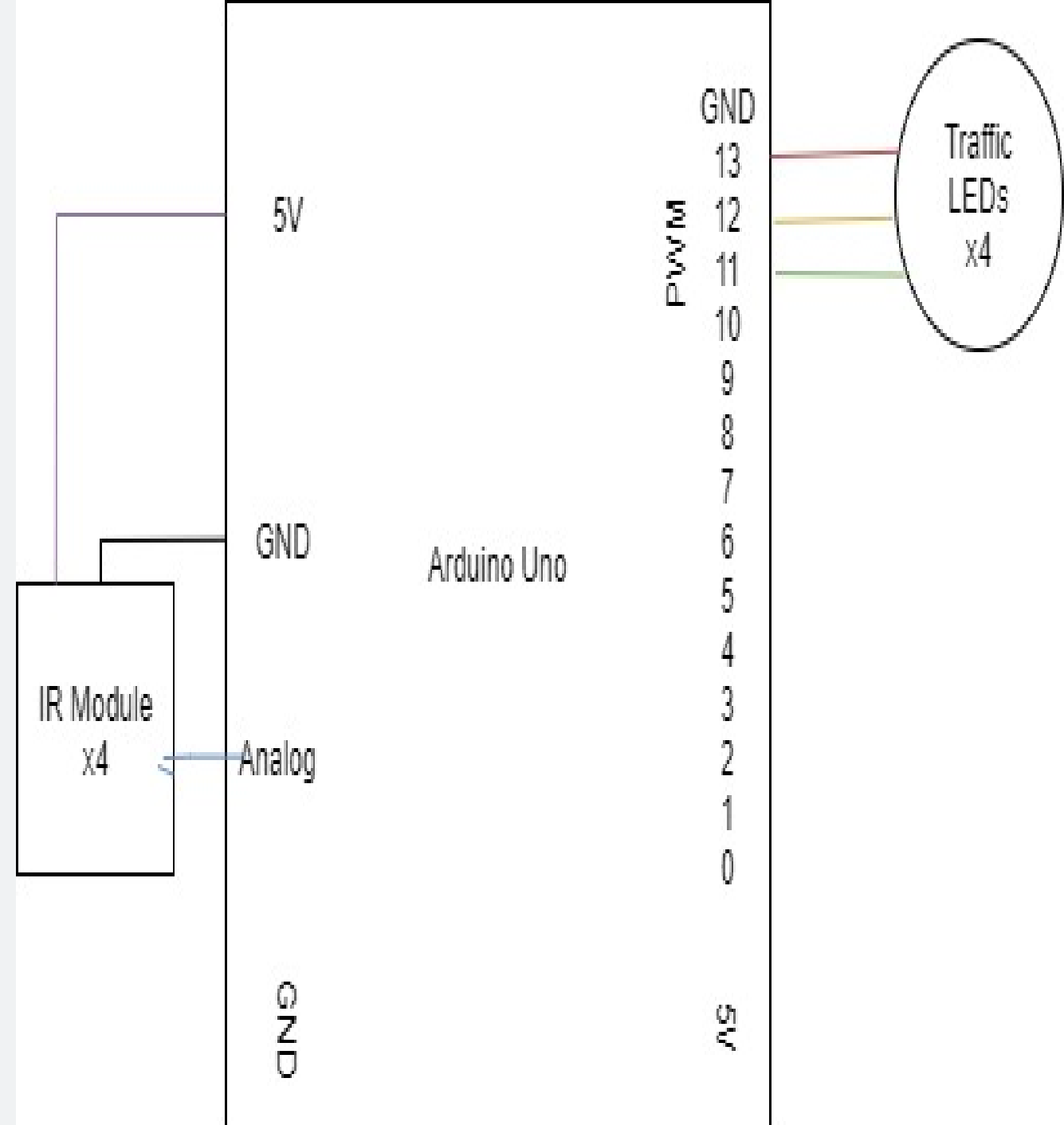


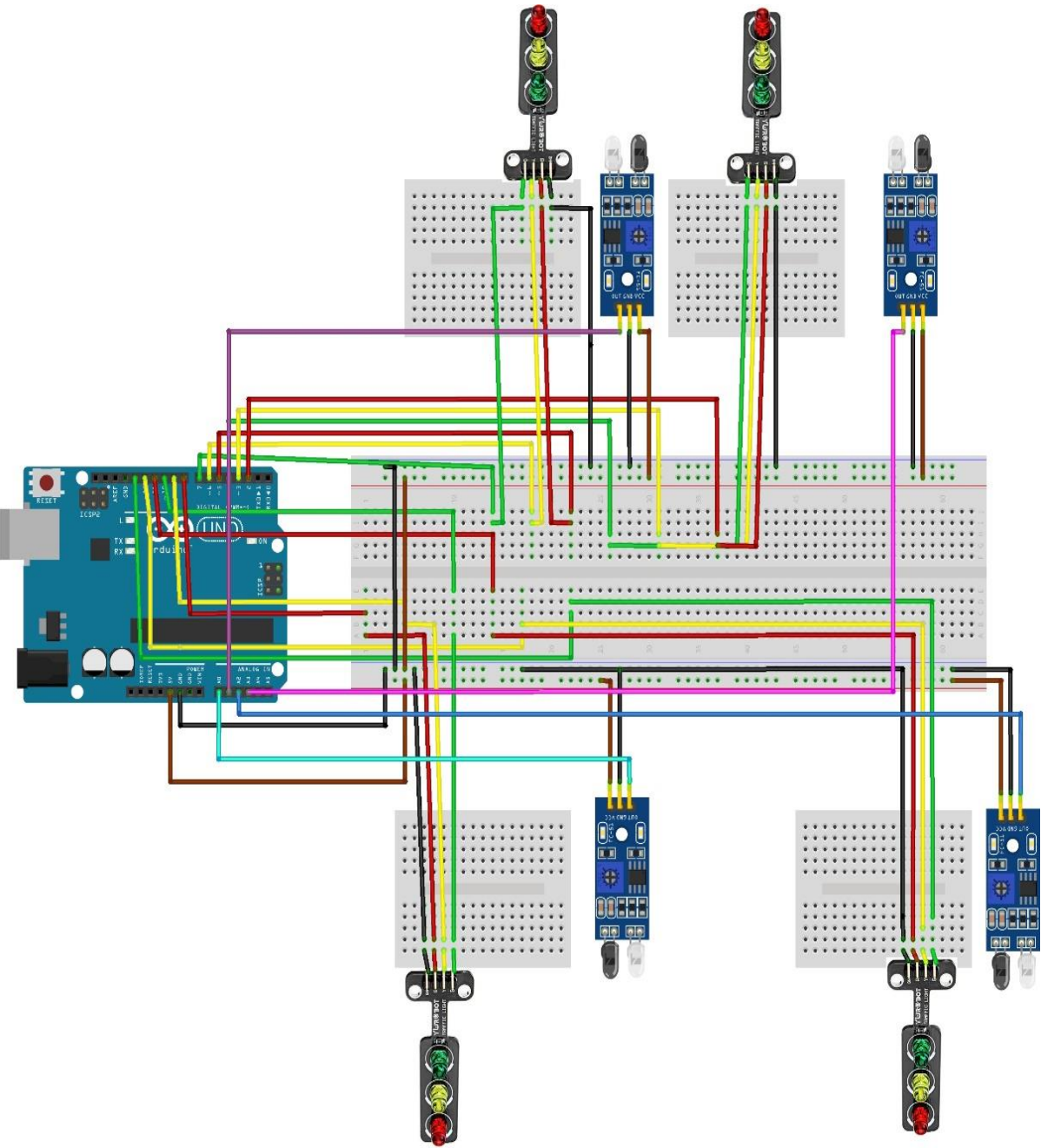
Overview



Hardware Diagram

- This is a representation of the hardware components used and how they are interconnected





Fritzing Diagram

- This Fritzing diagram illustrates the pin out of the IR sensors and traffic lights to the microcontroller.

Hardware

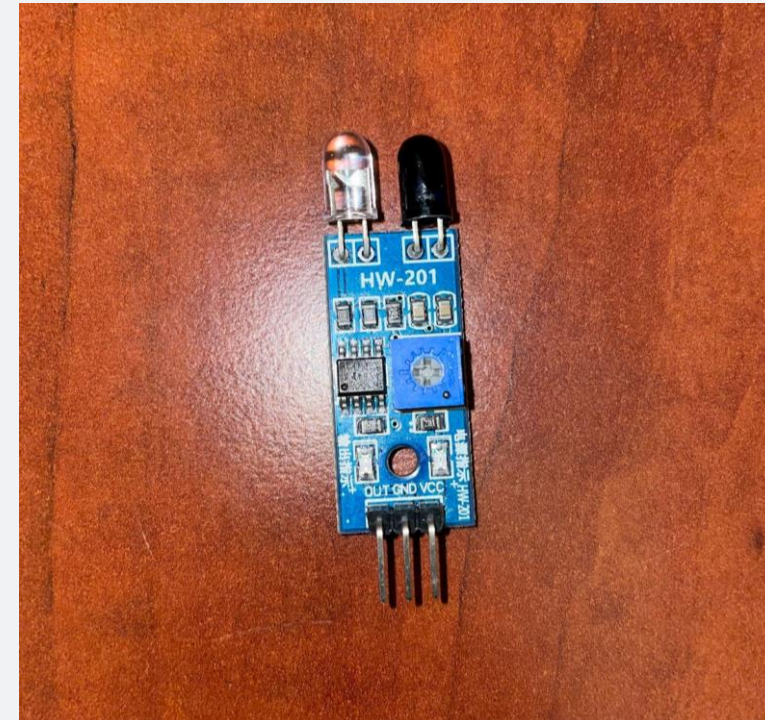
- Arduino Uno

Arduino Uno is a microcontroller board based on the ATmega328P.



- IR sensors

The transmitter emits a light that bounces off of objects and is reflected back to the receiver to detect the presence of objects.



Hardware

- Traffic Light LEDs

The traffic light module contains 3 LEDs in the colors red, yellow, and green to simulate a traffic light



- 9V Battery

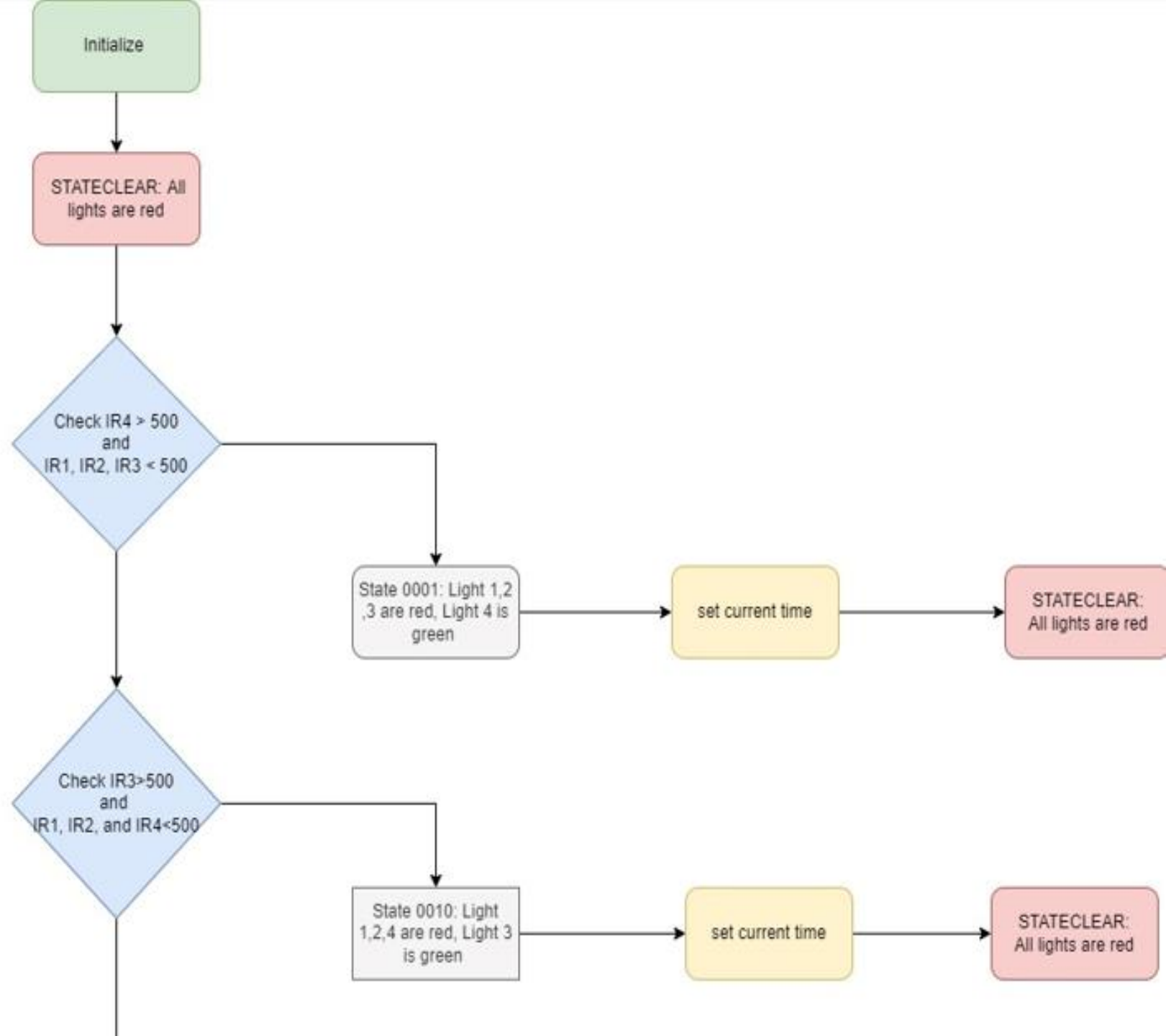
The power source for our project



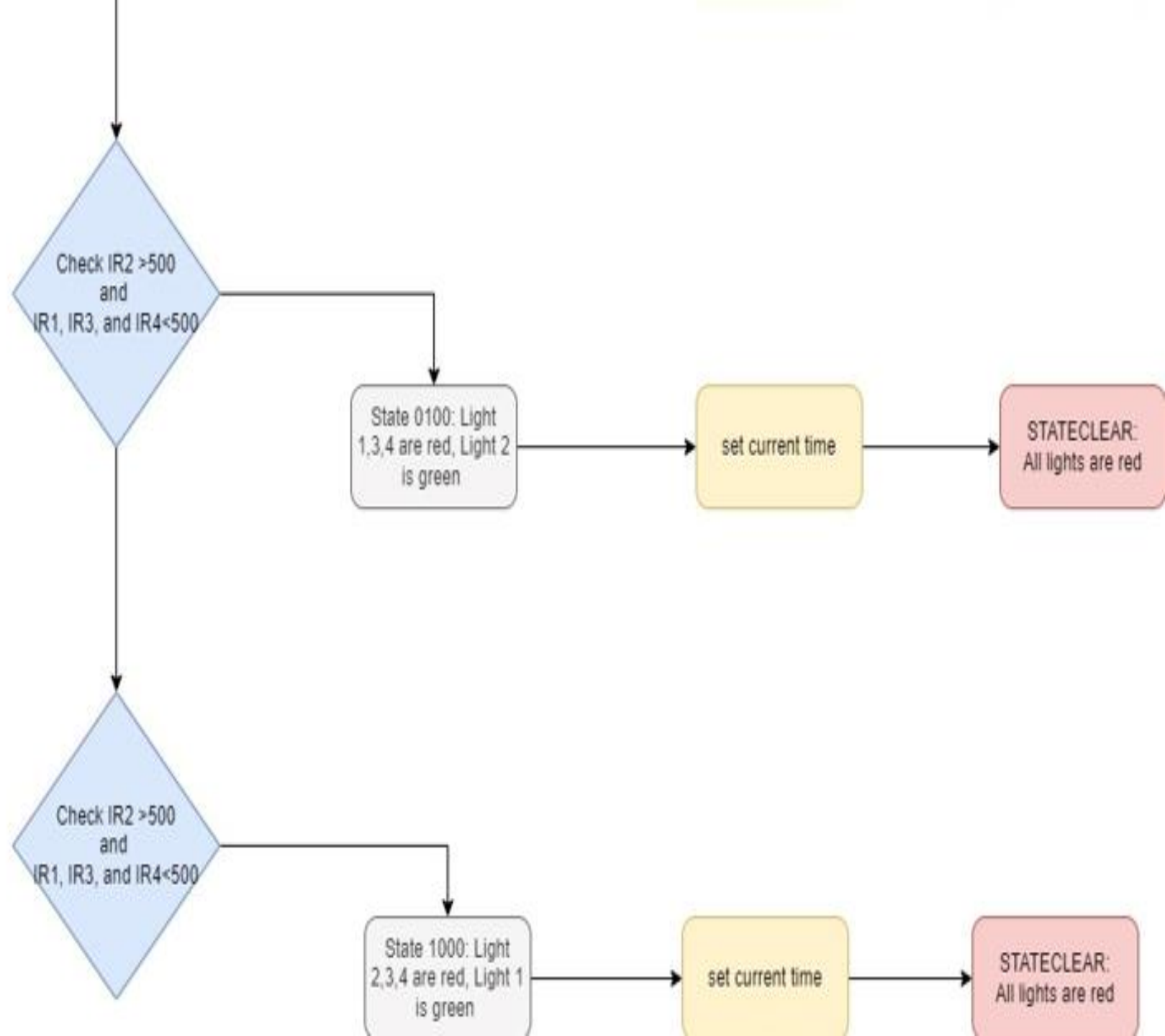
Power Consumption

	Arduino Uno	HW-201 IR Sensor	Traffic LEDs	Total
Operating Voltage	3.3V - 5V	3.3V - 5V	3.3V - 5V	5V
Current Requirement	11.45mA	20mA	R/Y = 13mA G = 25mA	70 mA

Software Diagram



Software Diagram



SIMPLE GANTT CHART by Vertex42.com
<https://www.vertex42.com/ExcelTemplates/simple-gantt-chart.html>

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Mon, 1/18/2021

1

Jan 18, 2021	Jan 25, 2021	Feb 1, 2021	Feb 8, 2021	Feb 15, 2021	Feb 22, 2021	Mar 1, 2021	Mar 8, 2021
18 19 20 21 22 23 24	25 26 27 28 29 30 31	1 2 3 4 5 6 7	8 9 10 11 12 13 14	15 16 17 18 19 20 21	22 23 24 25 26 27 28	1 2 3 4 5 6 7	8 9 10 11 12 13 14

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Project Start:

Mon, 1/18/2021

Display Week:

10

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Gantt Chart

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Project Start:

Mon, 1/18/2021

Display Week:

33

Aug 30, 2021

Sep 6, 2021

Sep 13, 2021

Sep 20, 2021

Sep 27, 2021

Oct 4, 2021

Oct 11, 2021

Oct 18, 2021

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Project Start:

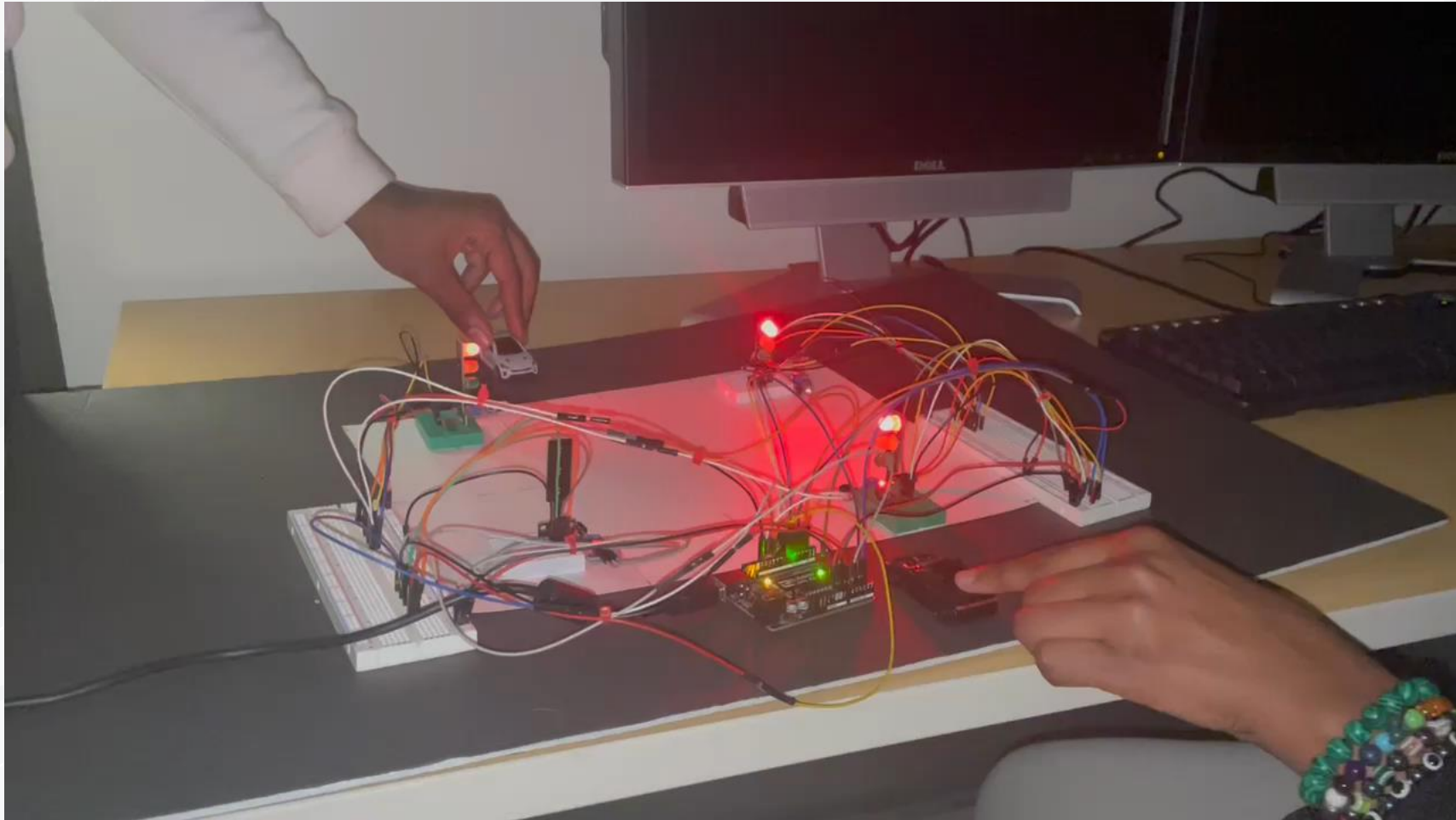
Mon, 1/18/2021

Display Week:

40

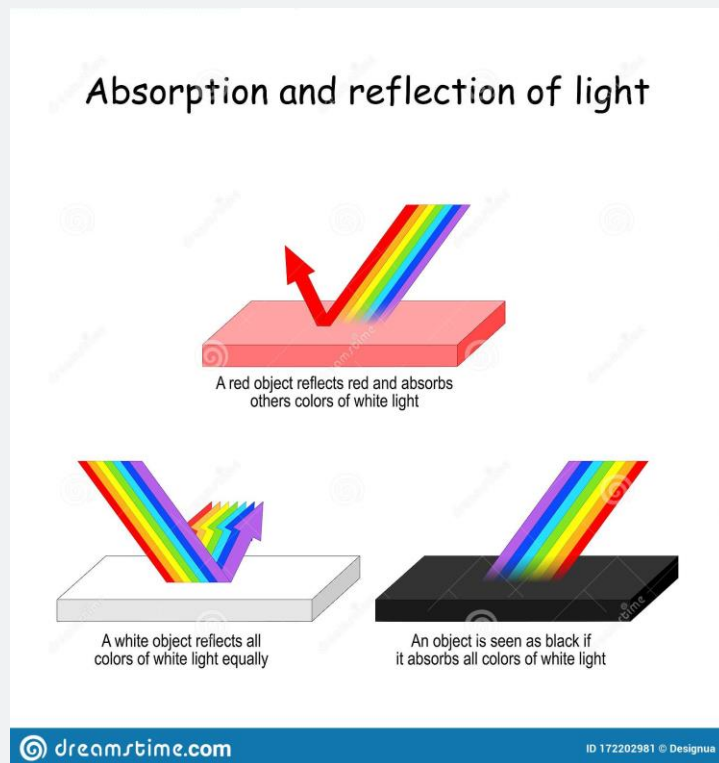
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Video Demonstration



Important Discoveries

- Limitation of IR sensors due to science of light
- Limitations of LiDAR and Arduino compatibility



Future Works

- Due to time constraints, we were not able to utilize the LiDAR's sensing capabilities as first intended. For future works, we would like to see multiple LiDAR scanners implemented into the system to provide a clearer picture of the traffic intersection. We would also utilize a more powerful processor so that the information received from the LiDAR is easier to work with.



Questions?