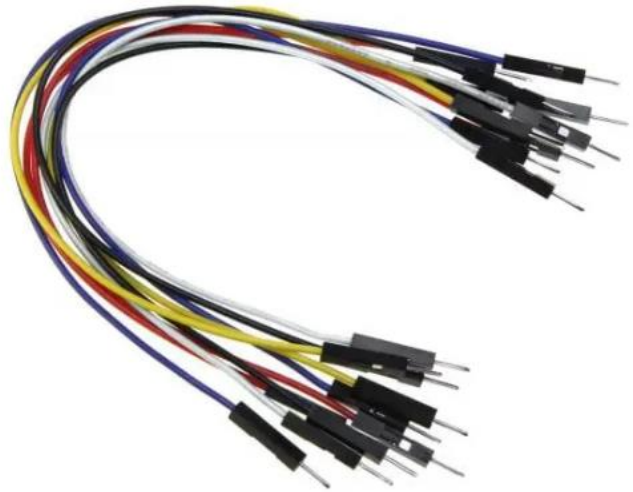
Traffic Lights

Instructions and Wiring Diagrams

{Learn, Create, Innovate};

Requirements

- Arduino (MEGA, Nano, etc.)
- 2 Traffic Lights (Assembled)
- 6 Wires male to male



Steps to follow

1. Assemble the Traffic lights as shown in the following diagrams.
2. Download the program to the Arduino Mega from GitHub.
3. Install the Required libraries for Arduino.
4. Flash the Arduino.
5. Make the appropriate connection according to the wiring diagrams.
6. Connect the Arduino to a power supply.
7. Verify if the traffic lights are working correctly.
8. Place the Traffic Lights in the correct position on the track.

Traffic Light Assembl

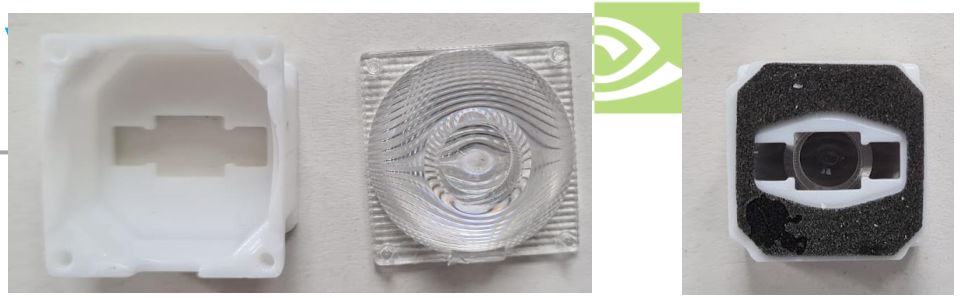


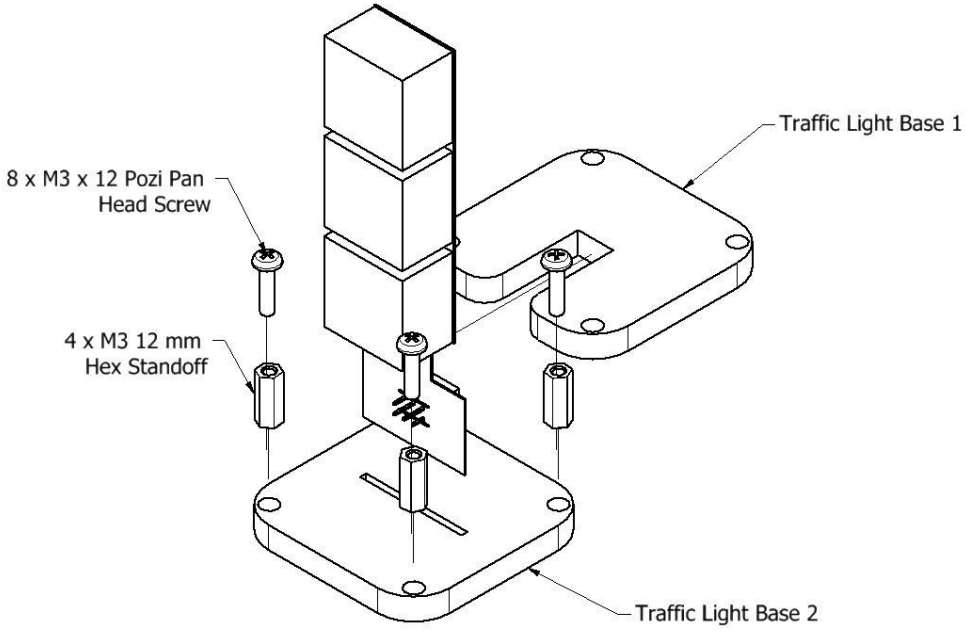
Figure 1: Light diffuser

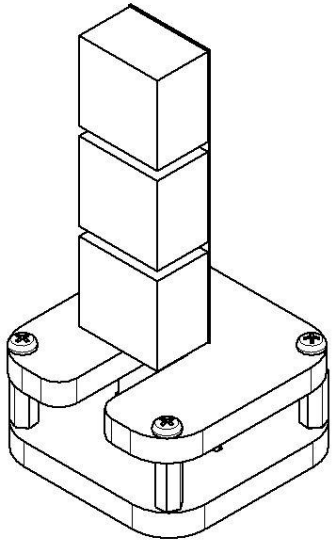
- Traffic light is composed of 2 parts
  - PCB (LEDS soldered)
  - Light Diffusers (Base and plastic diffusers)
    - The Light Diffusers come as a stick-on attachment.
- Assembly Steps:
  - Remove the plastic diffuser (transparent) and peel off the stick base, as shown in Figure 1
  - Attach the plastic base (white) to the PCB, as shown in Figure 2
  - Attach the transparent diffuser to the base (be careful with the small plastic indentation) Figure 3
  - Assembly of the Traffic light as shown in the next slide

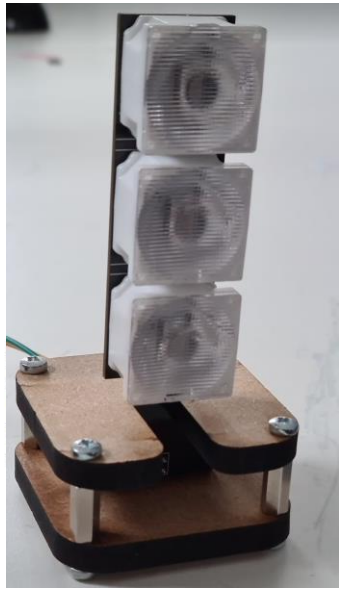
Figure 2: Base attachment

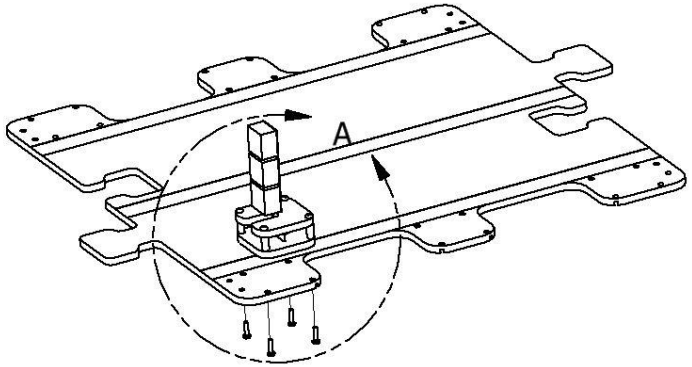
Plastic indentation

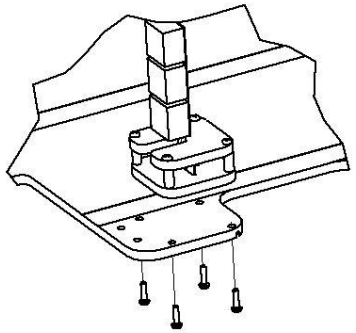
Figure 3: Diffuser attachment



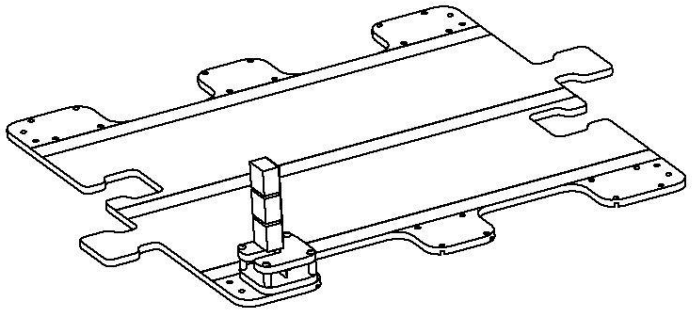








DETAIL A
SCALE 1/3



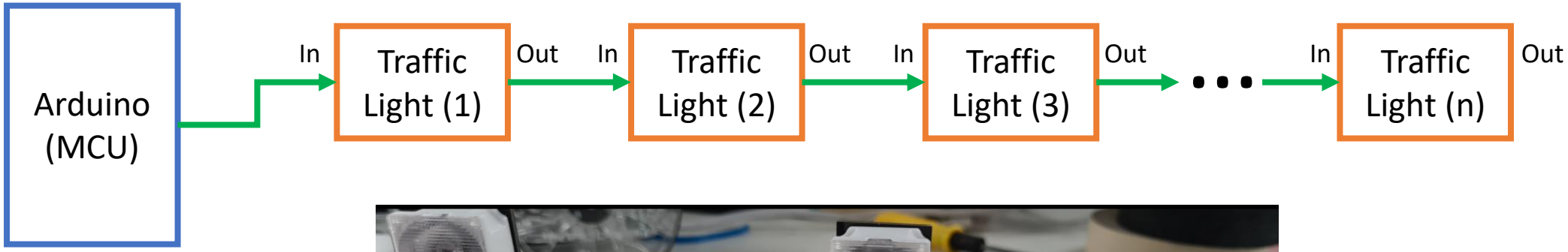
Material:
MDF (6mm Thickness)

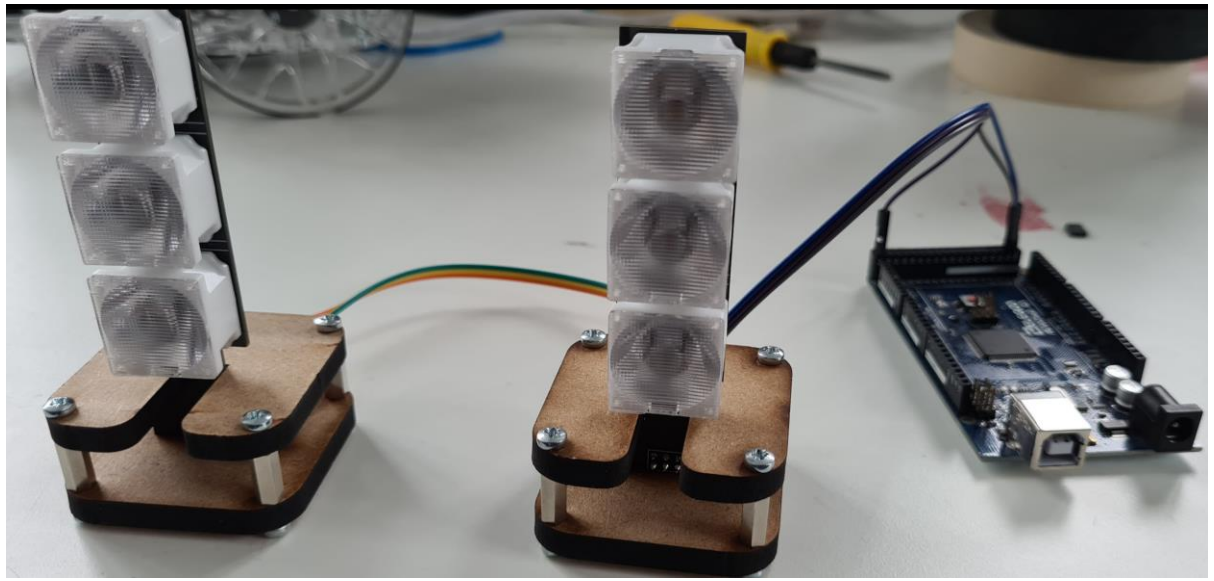
Traffic Lights Requirements:
8 x M3 x 12 mm Pozi Pan Head Screws
4 x Hex standoff, Steel, M3, 12 mm

DRAW: Mario Martinez	DATE: 4/4/2022	DIM: MM	SCALE: 1 : 1	MATERIAL:	STATUS: WorkInProgress
ENG:	DATE: 3/23/2022	TITLE / DESC: MCR2_1008_12_Traffic_Light_Single_Assy			
APPROVED BY:	DATE:	PART NUMBER: MCR2_1008_11_Traffic_Light_Single_Assy			
MANFR:	DATE:				
THIRD ANGLE PROJECTION	PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF MANCHESTER ROBOTICS LTD. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF MANCHESTER ROBOTICS LTD. IS PROHIBITED	REV:	SIZE: A3	TOLERANCES UNLESS OTHERWISE SPECIFIED:	ONE PLACE (X.X) = ±0.50 TWO PLACES (X.XX) = ±0.20 THREE PLACES = ±0.10 ANGULAR = ±1°
		SHEET: 1 OF 1			

Connection Diagram (Example Arduino Mega)

The traffic light communication is done via a daisy chain protocol





Connection Diagram (Example Arduino Mega)

- The connections for the input and the output follow the servo motor standard (Figure 5)
- The input and output of the daisy chain connection is shown in Figure 4.

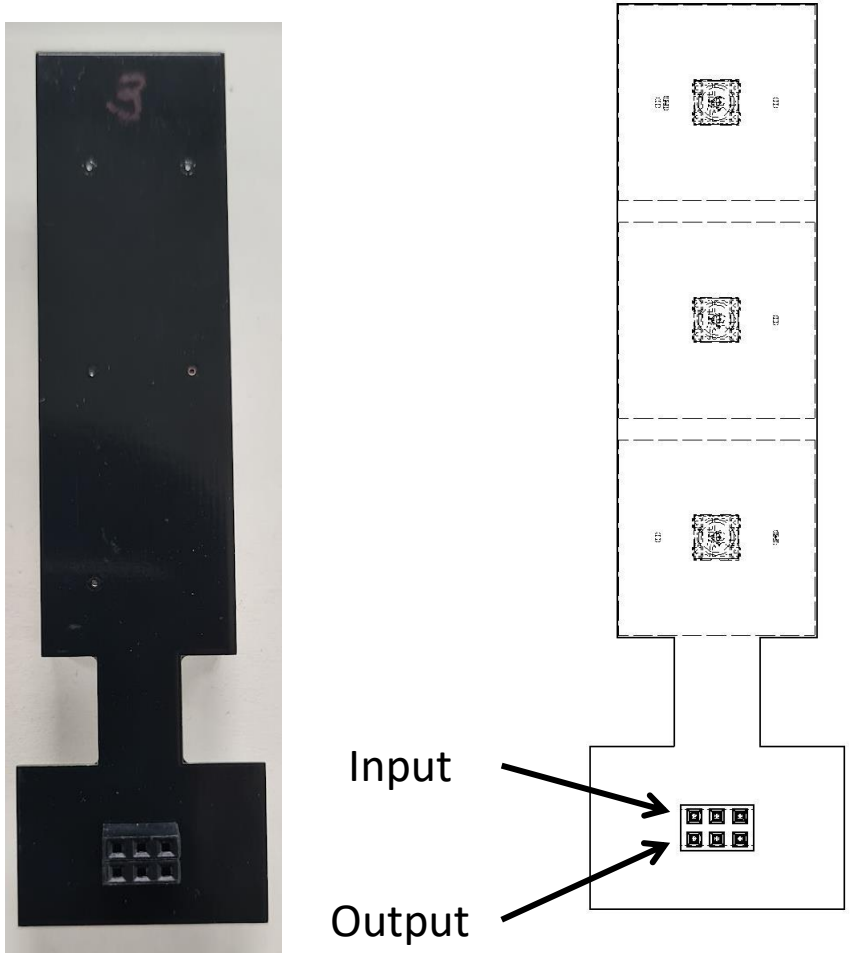


Figure 4: Traffic Light Back View

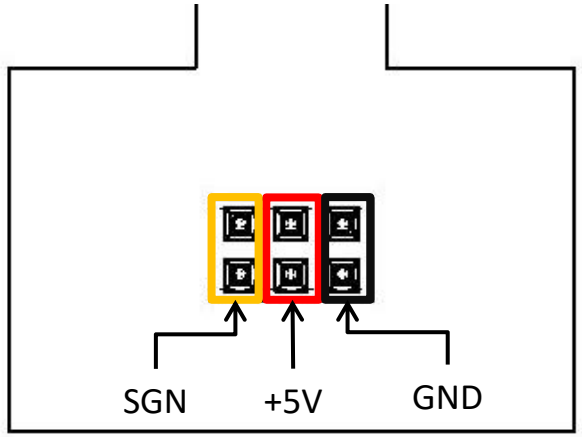


Figure 5: Connection Pins

Connection Diagram (Example Arduino Mega)

- The connection diagram using the Arduino Mega is shown in Figure 6.
- By default, the Pin selected in the Arduino Mega for the SGN is pin 52.
- Flash the Arduino (Next Slide)
- The SGN Connection Pin for the Arduino can be changed in the file:

  nlights.ino (line 12)

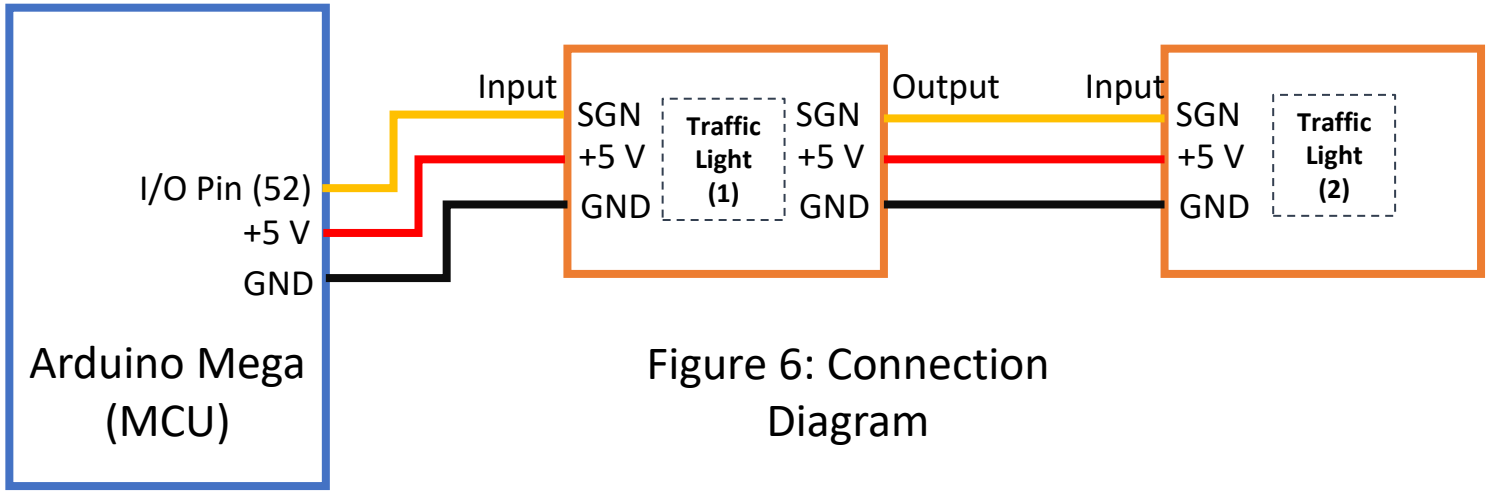


Figure 6: Connection Diagram

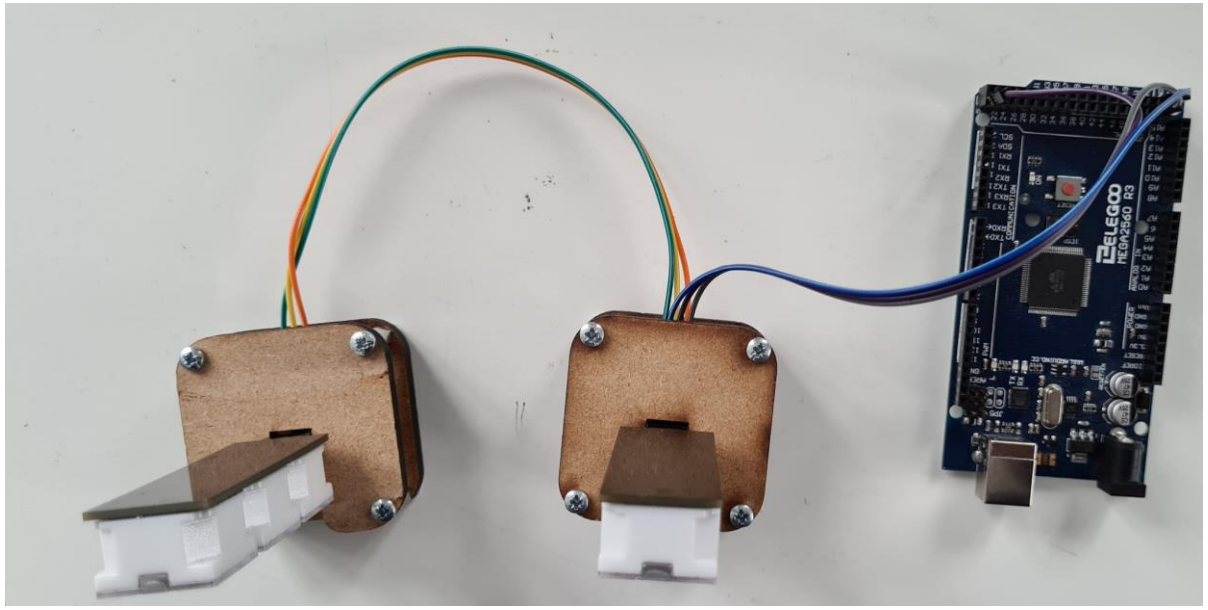


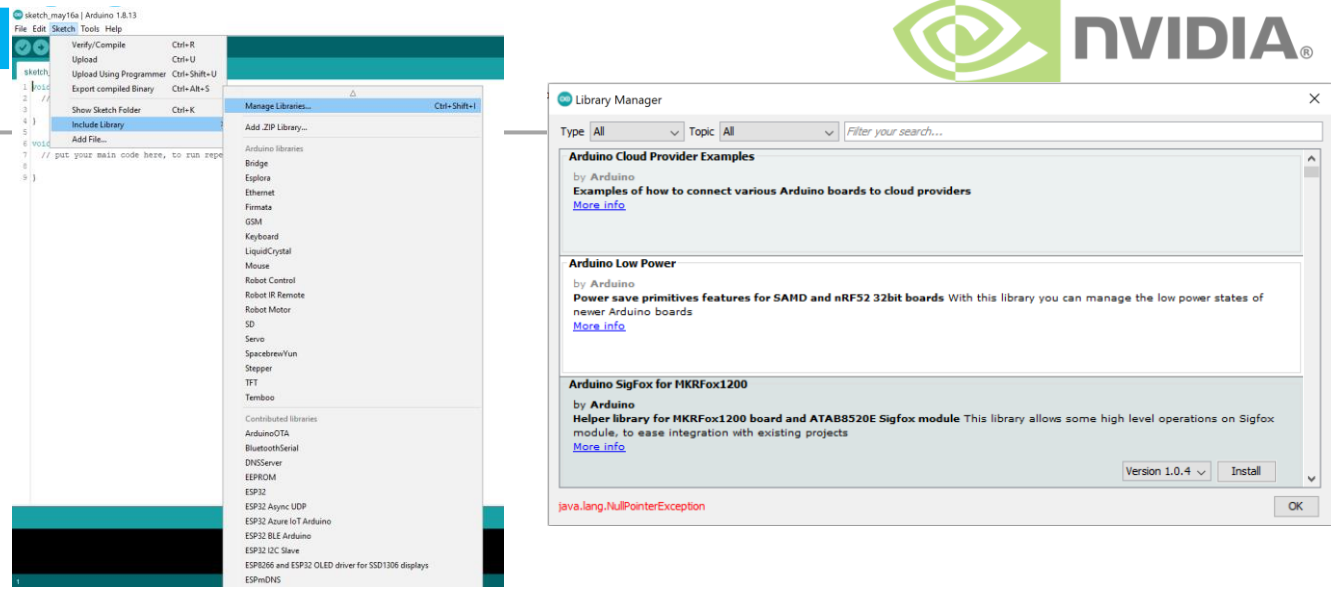
Figure 7: Connection with real Traffic Lights

Flashing the Arduino

- Connect the Arduino to the computer
- Open the program:
  nlights.ino
- Make sure the correct libraries are installed. (Next Slide)
- Make the necessary changes (Pins, time, etc.).
  - The SGN Connection Pin for the Arduino can be changed in line 12.
- Upload the program to the Arduino
- Verify if the Traffic Lights are working

Arduino Librari

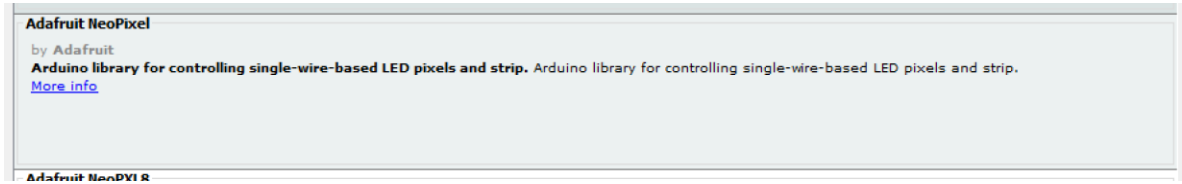
- To install an Arduino library, follow the next steps:
  - Go to *Sketch ›› Include Library ›› Manage Libraries*
  - A pop-up window will appear



Library Manager

- Search and Install the following Libraries

Adafruit_NeoPixel.h



Library to be Installed

- Restart the Arduino Environment