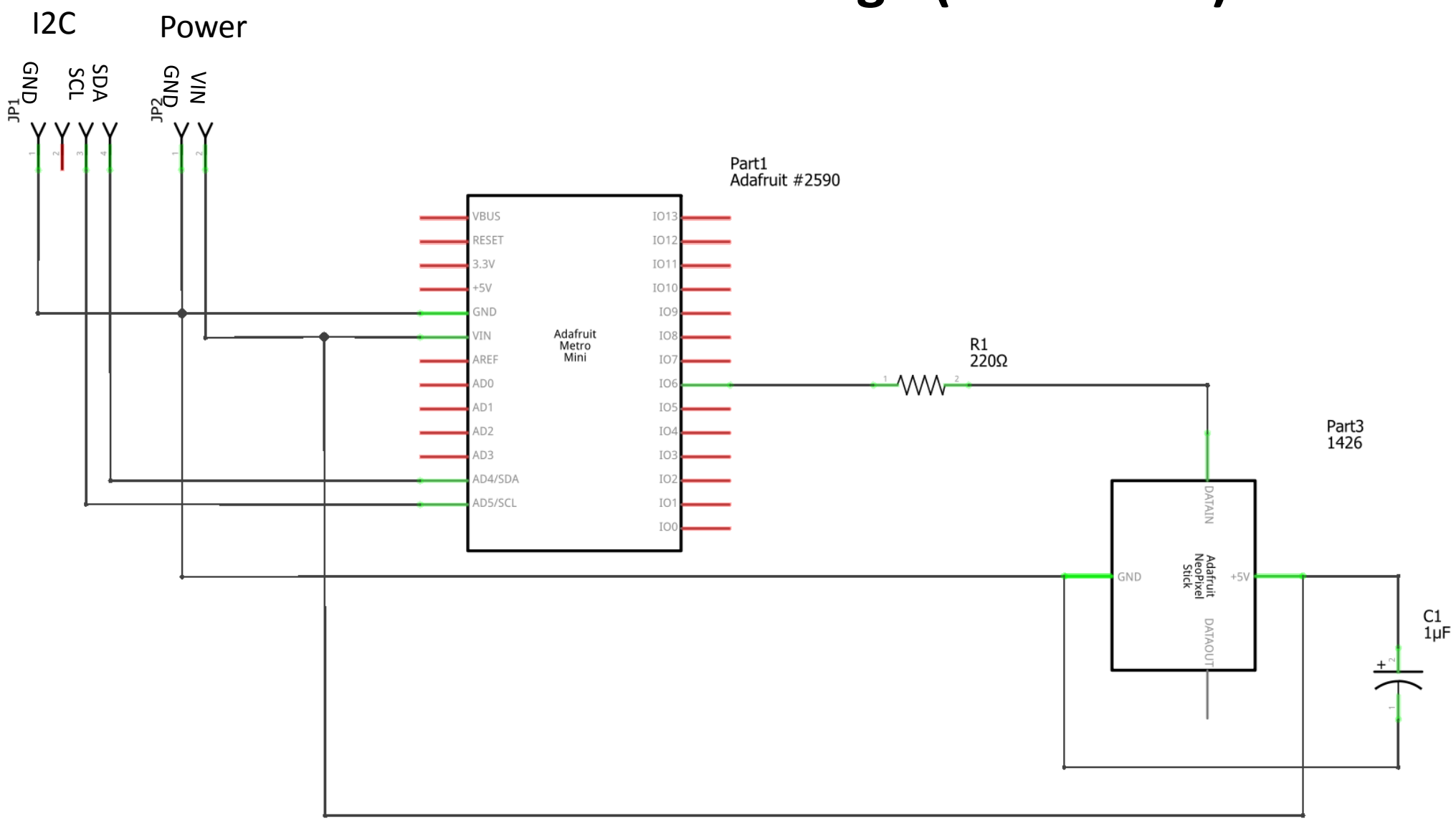
LED Design

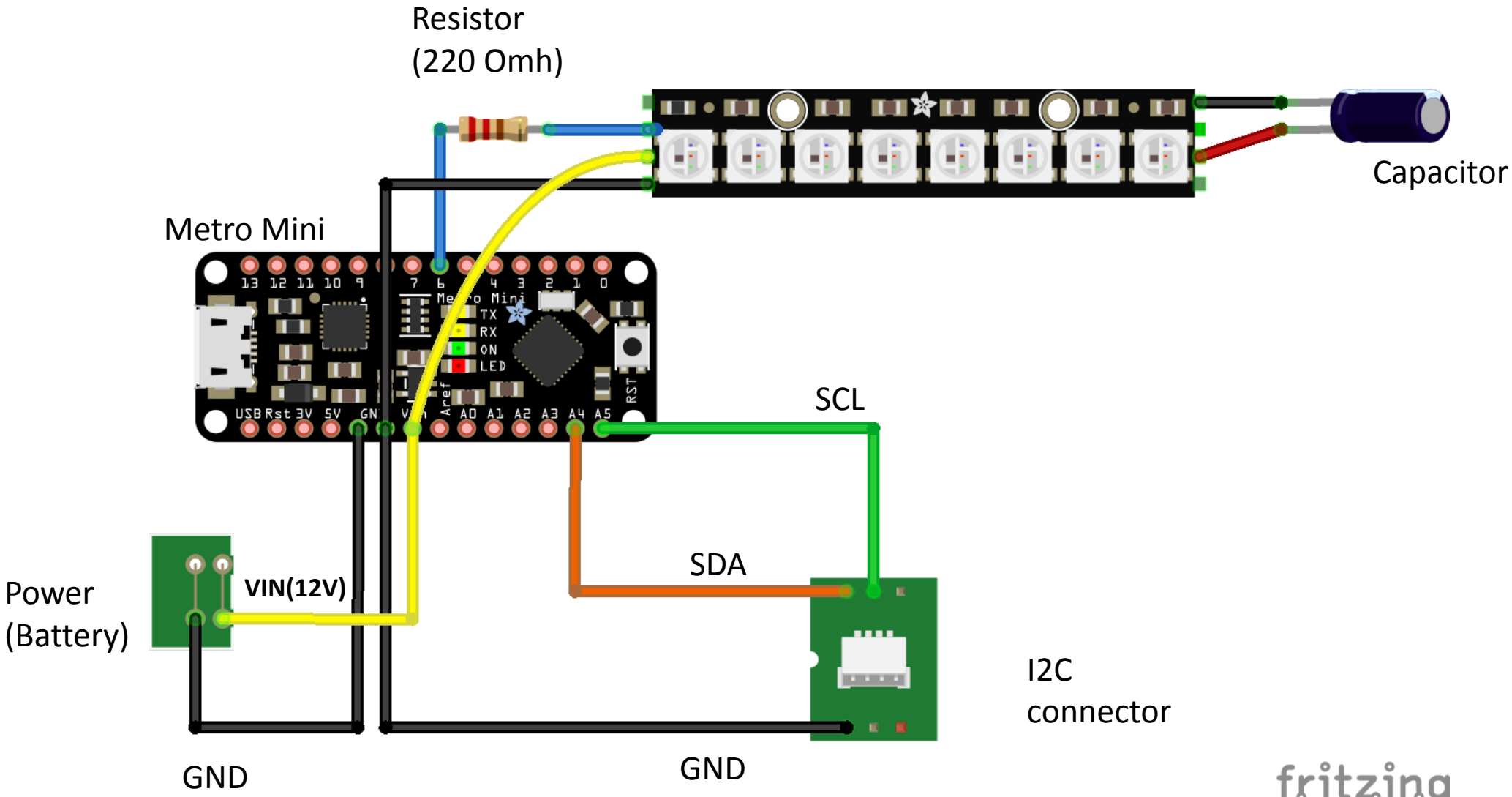
Arduino Team

FRC226

LED Module Design (Schematic)



LED Module Design (Wiring Diagram)

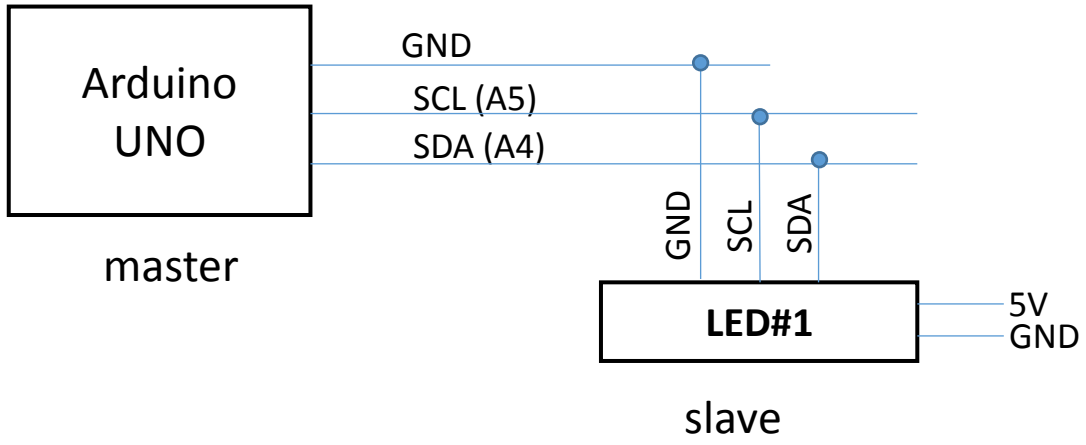


Programming on LED module

- Install the NeoPixel and Arduino thread libraries
- Load the NeoPixels_device.ino to the LED module
  - Revise the constant as needed (#pixels, device id)

    #define NUMPIXELS 8

    #define I2C_DEVICE_ID 8
- Use the Arduino UNO as the master for testing (code i2c_mater.ino attached)



LED I2C interface programming

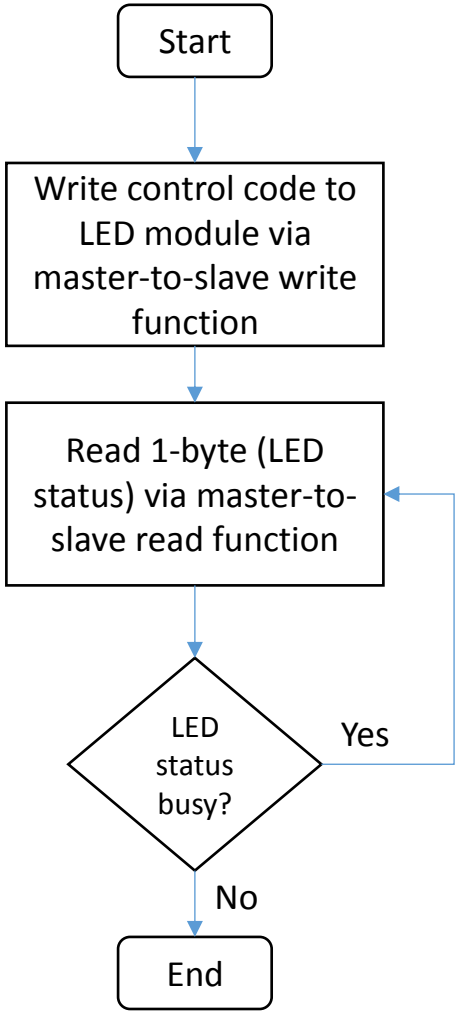
Control code

Name	data length #bytes	command						
		byte 0	byte 1	byte 2	byte 3	byte 4	byte 5	byte 6
Color gradient mode	5	0	addr	count	mode	Step interval		
Set color to a specific pixel	5	1	addr	red	green	blue		
Activate the pixels	1	2						
Enable serial line (rs232) debug console	1	3						
Disable serial line (rs232) debug console	1	4						
Reset, black out all pixels	1	5						
Set color to all pixels	4	6	red	green	blue			
Set color to a subset of pixels	6	7	addr	count	red	green	blue	
Show blinking pattern for a subset of pixels	7	8	addr	count	red	green	blue	cycle interval
Show shifting pattern for a subset of pixels	6	9	count	red	green	blue	step interval	

	Parameter Name	Meaning
	addr	pixel address (0, #NUMPIXEL)
	count	number of pixels
	mode	0 - red, 1 - green, 2 - blue, 3 - RG, 4 - GB, 5 - RB, 6 - RGB, 7 - R<->B, 8 - G<->B, 9 - R<->B
	red	(0-255)
	green	(0-255)
	blue	(0-255)
	step interval	unit: milliseconds
	cycle interval	Unit: 0.1 second

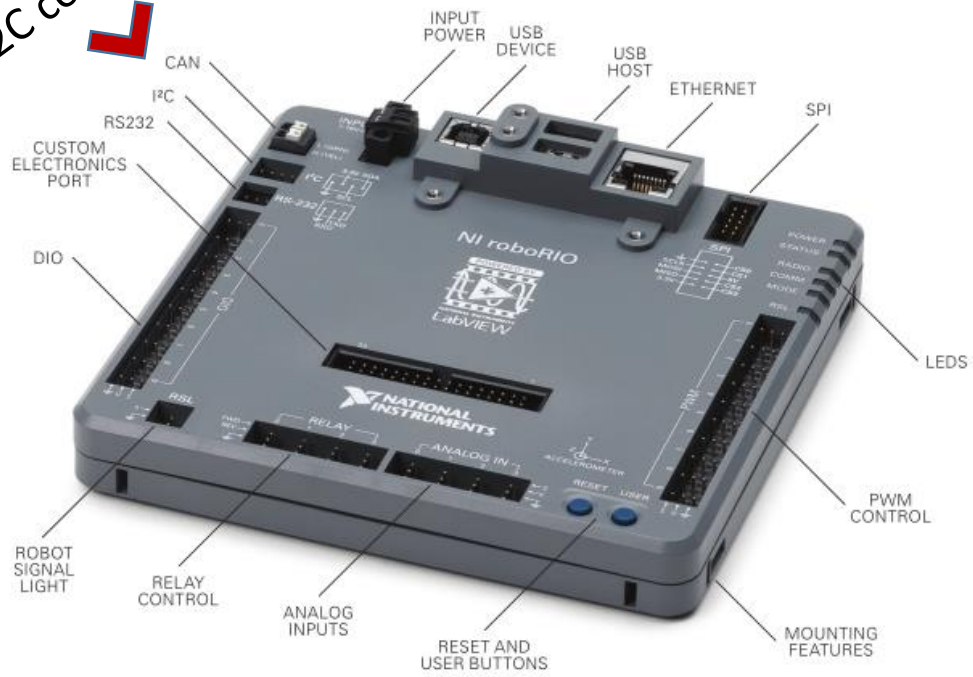
Status code

data length # bytes	byte 0
1	status: 0 - idle, 1 - busy



Integration on Robot

I2C connector



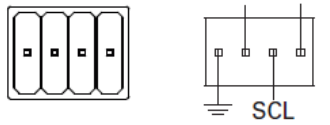
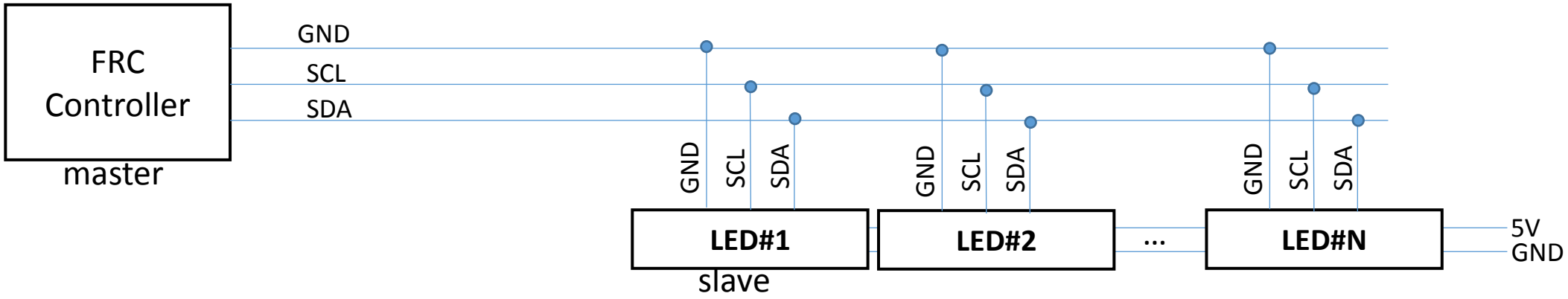


Table 5. I²C Port Signal Descriptions

Signal Name	Direction	Description
GND	—	Reference for digital lines and +3.3 V power output.
3.3V	Output	+3.3 V power output.
SCL	Input or Output	I²C lines with 3.3 V output, 3.3 V/ 5 V-compatible input. Refer to the *I²C Lines* section for more information.
SDA	Input or Output	

https://forums.ni.com/t5/FIRST-Robotics-Competition/roboRIO-Details-and-Specifications/ta-p/3494658



Tasks to be completed

Task	Leader	Date
Lab coordination (picking up the ordered parts, soldering station preparation, etc.)	??	
Building LED modules	??	
Flashing the software (NeoPixels_device.ino) to the LED modules	??	
Installing LED modules to the FRC robot	??	
Programming on FRC robot (Java)	Christine Zeng	
Testing the LED system on FRC robot	Christine Zeng & ??	