

Week 12 - Project Progress Report

CIS-033, Spring 2024

Melissa Li
Apr 27, 2024

Table of Contents

Timeline & Current Status.....	2
Status of Parts.....	2
Accomplishments This Week.....	3
Unit Tests of Components.....	3
1. Shift Register + 8x LEDs.....	3
2. LCD with I2C backpack.....	4
3. RGB LED.....	5
4. Passive Buzzer.....	6
5. NOT Unit Tested.....	6
Pin Assignment Table.....	7
Circuit Schematic.....	8

Timeline & Current Status

Week of	Done?	Planned Actions
April 22, 2024	x	• Project Timeline Plan (<i>this</i>)
	x	• Assemble components
	x	• Determine Arduino Pin Assignments for all components
	x	• Do Unit Tests, verify individual components / blocks
	x	• Prepare schematic with all connections
April 29, 2024		• Breadboard full circuit, with all components
		• Merge unit-test codes, verify components in single programs
		• Design & document Game Logic
May 6, 2024		• Build structure to assemble all components suitable for game
		• Mount RGB LED onto Servo-controlled part, and align fixed color LED in semi-circle around former
		• Add score & game time
		• Add simple sounds for game
		• Test game mechanics
May 13, 2024		• Last minute changes (if any)
		• Final polish

Status of Parts

Components

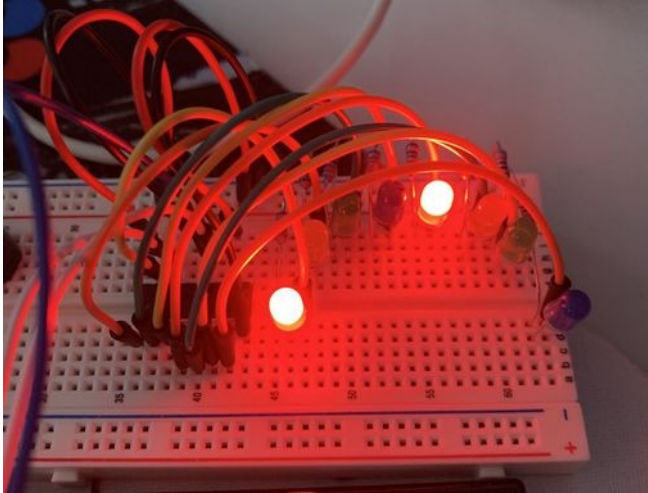
- (Mostly using parts from Elegoo kit)
- ADDED to Project, since last week's report: (these also in Elegoo kit)
 - **Passive Buzzer:** for basic sounds
 - **Push button:** for user confirm input
- **Purchased & received:** LCD with I2C backpack
 - (*Save I/Os over parallel LCD, I/Os used by other components*)

Accomplishments This Week

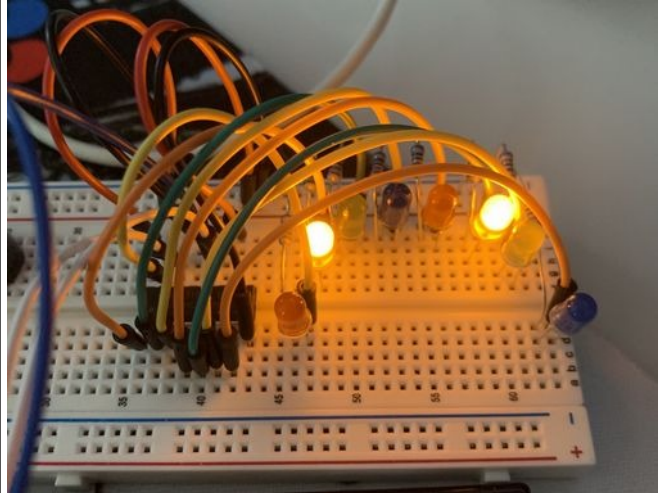
Unit Tests of Components

1. Shift Register + 8x LEDs

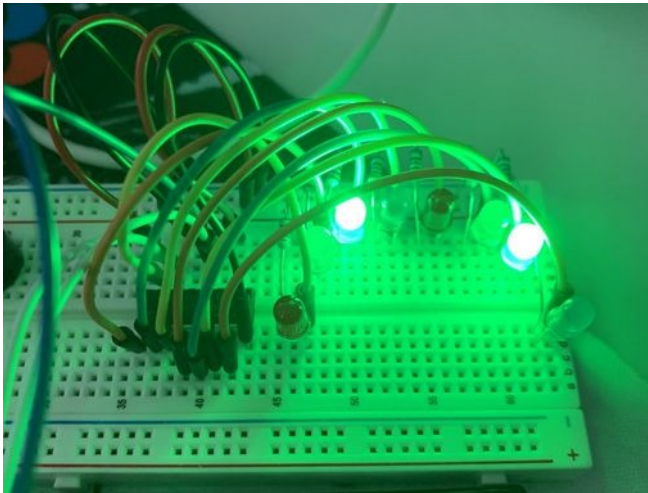
a. Red LEDs On (1st & 5th)



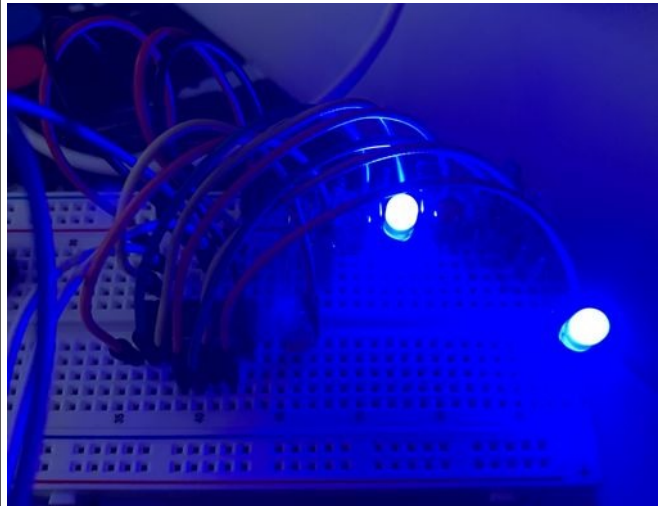
b. Yellow LEDs On (2nd & 6th)



c. Green LEDs On (3rd & 7th)



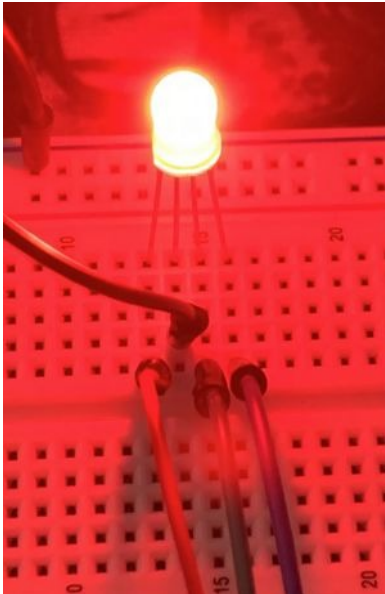
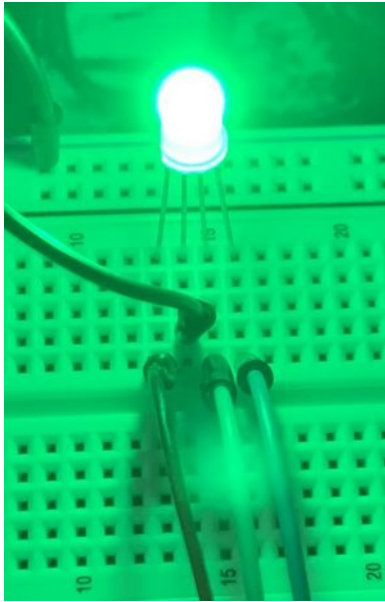

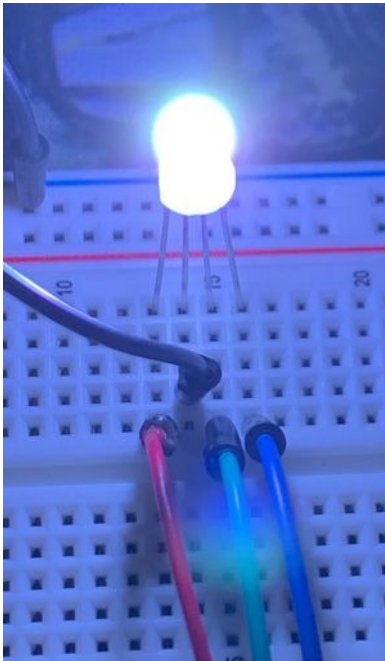
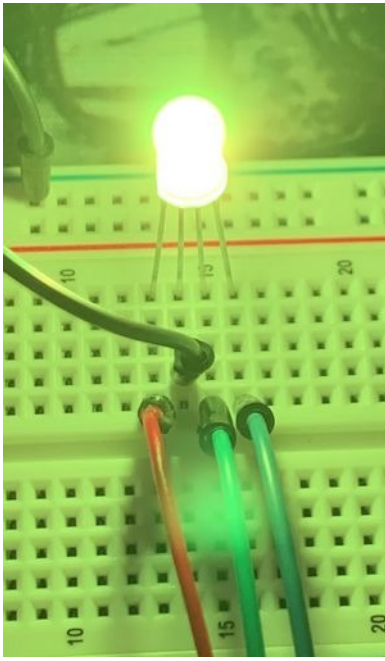
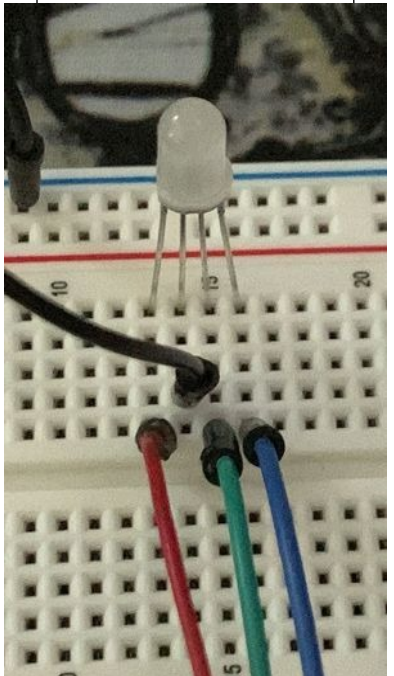
d. Blue LEDs On (4th & 8th)



2. LCD with I2C backpack






3. RGB LED

a. RGB LED emitting Red Color	b. RGB LED emitting Green Color	c. RGB LED emitting Blue Color
		
d. RGB LED emitting White Color	d. RGB LED emitting Yellow Color	f. RGB LED off
		

4. Passive Buzzer

(Use "Tuner" app on Smartphone, to "show" sound frequency being emitted by buzzer)

Play 3 notes, from A-major chord: A, C#, E.

a. Tone played at A ₃ (220 Hz)	b. Tone at C# ₃ (139 Hz; shown as Db ₃)	b. Tone at E ₃ (165 Hz)
 A smartphone screen displaying the 'Tuner' app. The screen shows a green horizontal bar in the center, indicating the note A ₃ . Below the bar, the text '+0.2c' is visible. The app interface includes buttons for 'Practice', 'Stats', 'Recordings', and 'Settings' at the bottom. The phone is connected to a breadboard with a black buzzer and a blue wire.	 A smartphone screen displaying the 'Tuner' app. The screen shows a green horizontal bar in the center, indicating the note D ^b ₃ . Below the bar, the text '+3.1c' is visible. The app interface includes buttons for 'Practice', 'Stats', 'Recordings', and 'Settings' at the bottom. The phone is connected to a breadboard with a black buzzer and a blue wire.	 A smartphone screen displaying the 'Tuner' app. The screen shows a green horizontal bar in the center, indicating the note E ₃ . Below the bar, the text '+5.3c' is visible. The app interface includes buttons for 'Practice', 'Stats', 'Recordings', and 'Settings' at the bottom. The phone is connected to a breadboard with a black buzzer and a blue wire.

5. NOT Unit Tested

These components NOT unit-tested, because we have used them in previously in this course.

- **Joystick Input:** implemented in Week 5 Lab
- **Servo Motor:** implemented in Week 6 Lab
- **Push button Input:** implemented in Week 8 Lab, with Interrupts

Pin Assignment Table

Pin Special Fn ->					SDA	SCL	Serial Mon		Int0	Int 1; NO ~
Component \ Pin	A0	A1	A2	A3	A4	A5	D0	D1	D2	D3
(Serial Monitor)							(Serial)			
Joystick	IN	IN								
LCD w/ I2C (*1)					I2C	I2C				
Servo (*2)										
Passive Buzzer (*3)										
Shift Register (*4)										
RGB LED (*5)										
Push Button (*6)									IN, Int	

Pin Special Fn ->		~	~			NO ~	NO ~	NO ~		
Component \ Pin	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
(Serial Monitor)										
Joystick										
LCD w/ I2C (*1)										
Servo (*2)	OUT									
Passive Buzzer (*3)				OUT						
Shift Register (*4)					OUT	OUT	OUT			
RGB LED (*5)								OUT	OUT	OUT
Push Button (*6)										

Pinout Notes

(*1) I2C Addr = 0x27; LCD Display has 16 cols x 2 rows

(*2) Use of Servo library, disables analogWrite() (PWM) on pins 9 and 10

(*3) Use of tone() fn will interfere with PWM output on pins 3 and 11

(*4) Use Positive Logic, 1=on, 0=off; Shift Reg Outputs **Provide** power to LEDs

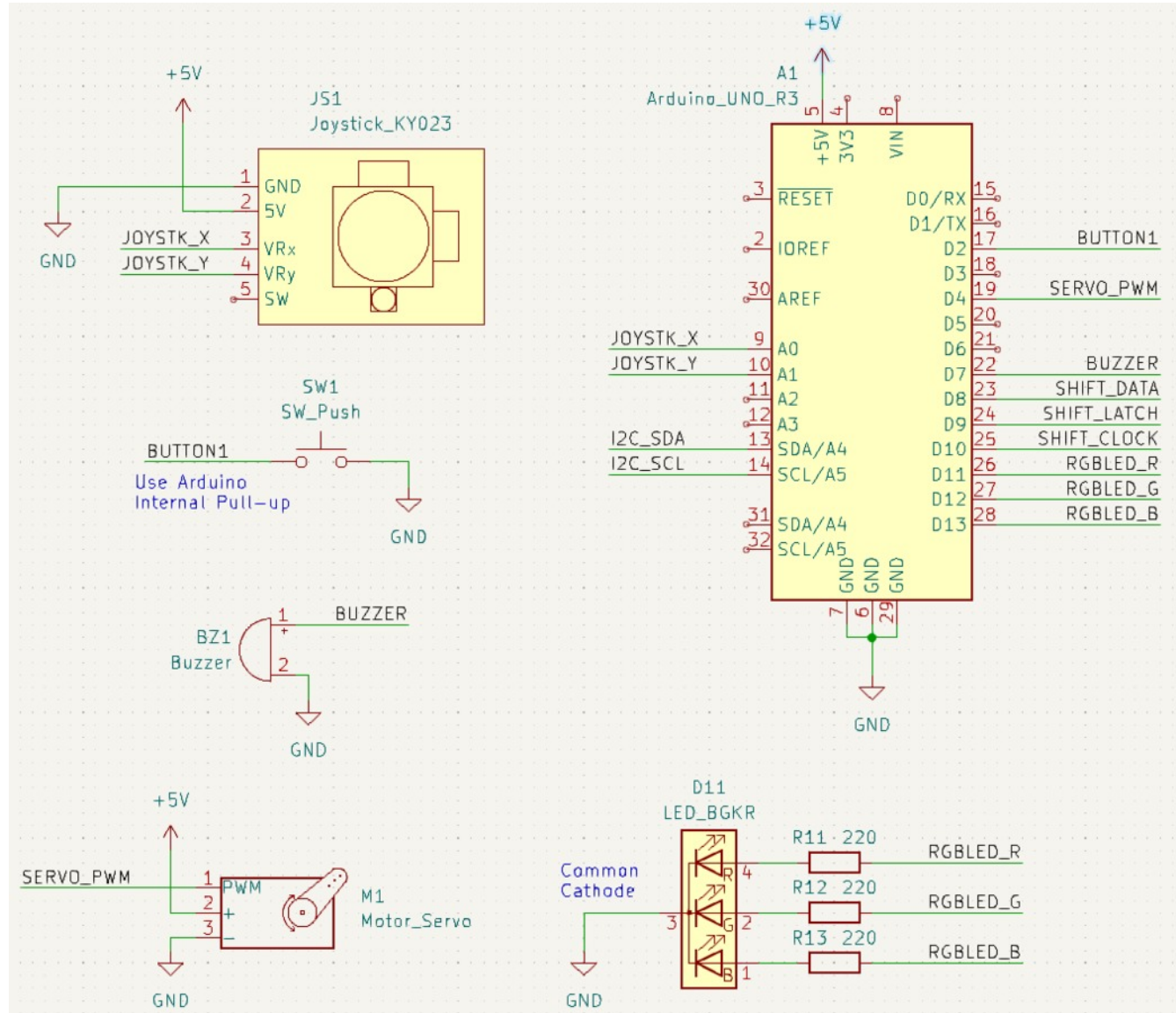
(*5) Use Positive Logic, 1=on, 0=off; RGB LED is **Common Cathode**

(*6) Use Arduino INPUT_PULLUP; Switch Input, 1=open, 0=closed

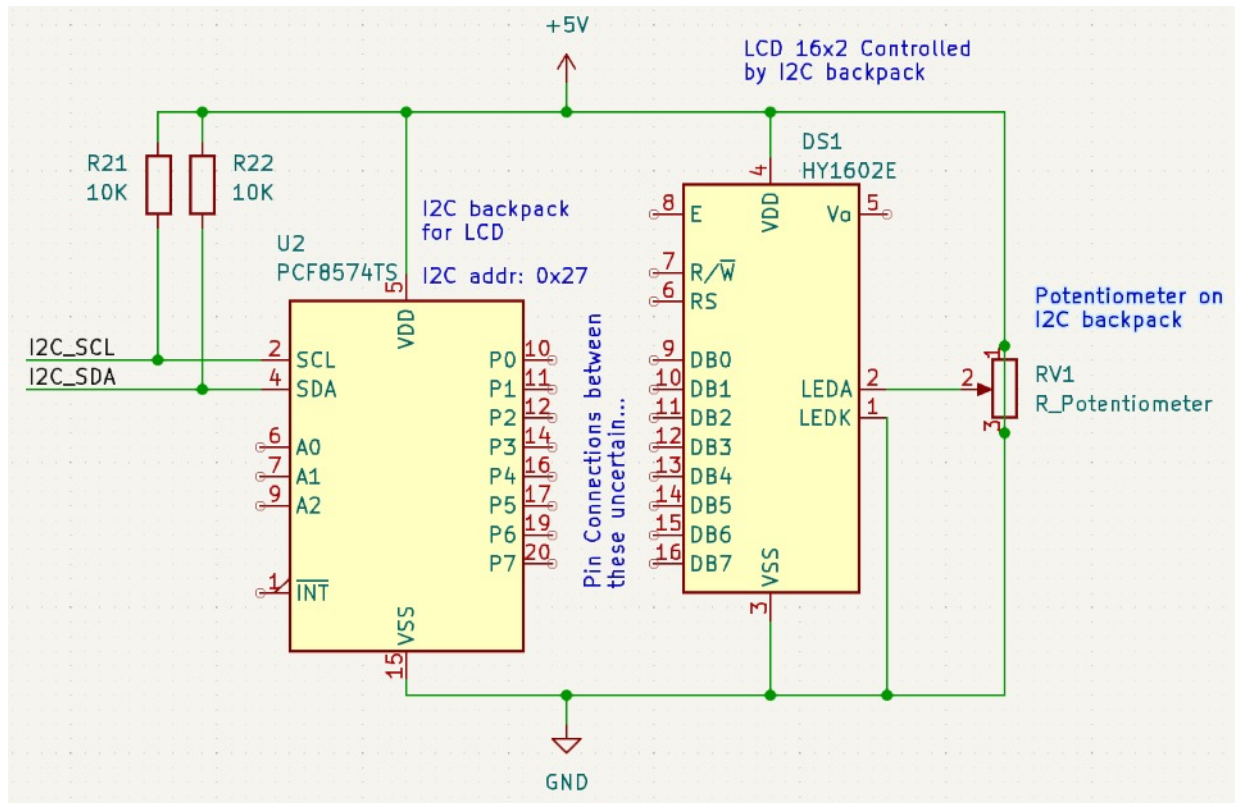
Circuit Schematic

(Schematic drawn in KiCad)

1. Arduino plus Small Components



2. LCD with I2C Backpack



3. Shift Register + 8x LEDs

