Week 11 - Project Identification Report
CIS-033, Spring 2024

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Project Proposal

Develop a simple small game with where user tries to "match" a randomly lit LED, as many times as possible in a given time. Position and color are the factors to match by the player.
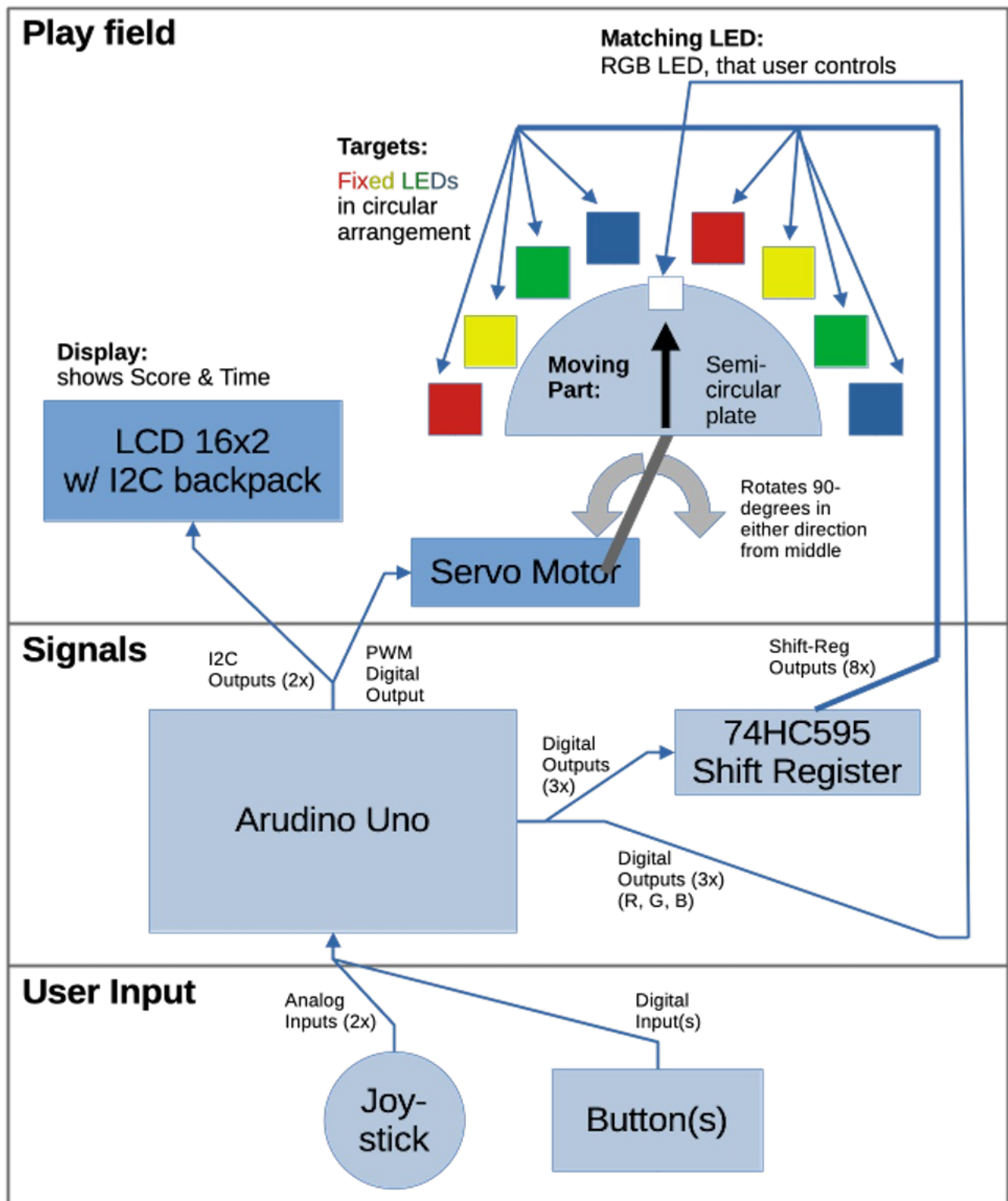
This is similar to a "Simon" toy that was popular in the 80s, but instead of pressing corresponding color/position, will use rotation for the latter.

- **Team Member (1):** Melissa Li

Major Components

- **Targets:** a series of 8 fixed LEDs of different colors, arranged in a semi-circle.

- **Moving part:** a semi-circular plate(?) mounted on a servo motor, which can be rotated 180 degrees. User can control plate rotation, in order to line-up to target(s).

- **Matching LED:** RGB LED mounted on edge of semi-circular plate ("moving part"). User can choose color this LED, in order to match the color of target(s).

- **Display:** LCD 16x2 display w/ I2C backpack, to show Score & Time Remaining.

- **User Inputs:** user provides inputs via joystick. Joystick x-axis is tied to rotation of servo motor. Joystick y-axis chooses color of RGB LED. Button(s) may be added for more inputs.

Block Diagram

Play field

Matching LED:
RGB LED, that user controls

Targets:
Fixed LEDs
in circular
arrangement

Display:
shows Score & Time

Moving Part:
Semi-circular plate

LCD 16x2
w/ I2C backpack

Rotates 90-degrees in either direction from middle

Servo Motor

Signals

I2C Outputs (2x)

PWM Digital Output

Shift-Reg Outputs (8x)

74HC595
Shift Register

Arudino Uno

Digital Outputs (3x)

Digital Outputs (3x) (R, G, B)

User Input

Analog Inputs (2x)

Digital Input(s)

Joy-stick

Button(s)

Components Required

Block	Components	Previous class reference	Have Part?
Targets	74HC595 Shift Register, for more Outputs 8x LEDs in (R,Y,G,B) + 220 ohm registers	Week 10	Yes, in kit Yes, in kit
Moving Part	Servo Motor Semi-circular Plate	Week 6	Yes, in kit Need find/purchase
Matching LED	RGB LED + 220 ohm registers	(n/a)	Yes, in kit
Display	LCD 16x2 display, with I2C backpack	Week 9	No, but Purchased
User Inputs	Joystick Push Button(s)	Week 5	Yes, in kit May purchase bigger buttons for easy pressing.

Arduino I/Os used

Quick count to make sure an Arduino Uno can handle all the connections required.

Block	Components	Arudino Pin(s)
Targets	74HC595 Shift Register	3x Digital Outputs
	8x LEDs	**None** (uses Shift Register Outputs)
Moving Part	Servo Motor	1x PWM Digital Output
Matching LED	RGB LED	3x Digital Outputs
Display	LCD 16x2 display, with I2C backpack	2x Outputs, specifically pins A4 & A5 for I2C
User Inputs	Joystick	2x Analog Inputs (axes)
	Push Button(s), as needed	<N>x Digital Input(s)
	TOTALS:	Digital Outputs: 7 Digital Inputs: <N> Analog Inputs: 2 ("Analog") Outputs: 2, for I2C