Let's Connect 4!

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1 Abstract

Connect-4 is a two-player game in which a player wins the game if all its four checkers line up in a row, or a column, or in a diagonal. In this project, an RGB LED matrix will used as the game board in order to distinguish players' checkers based on the color of LEDs. An LCD display will be used to let players decide color for their checkers and to the status of the game in real time.

2 Idea and Implementation

In my CS111 class, we developed an algorithm of Connect-4 game in python. The game was intended to be played in python interactive shell. In this project, I intend to refer to that algorithm to implement connect4 game using the hardwares as input and ouput.

Below is the list of apparatus required for this project:

1. 2 X Arduino Uno

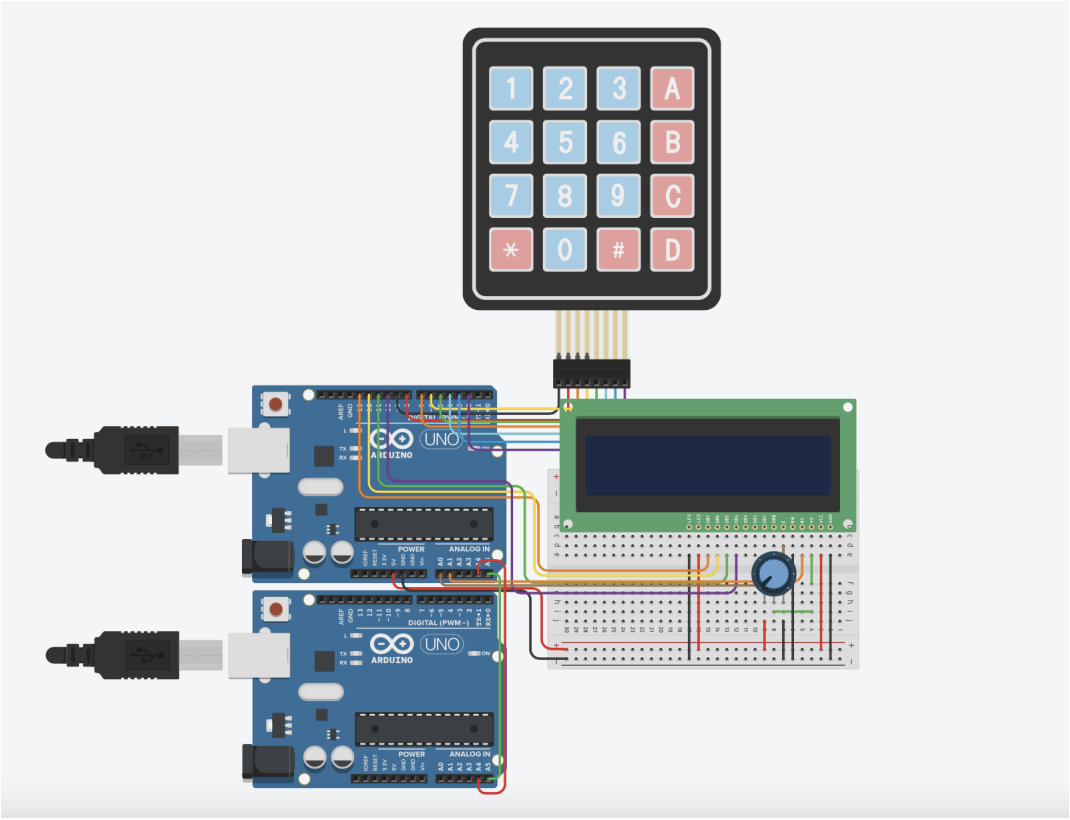
2. 1 X Breadboard

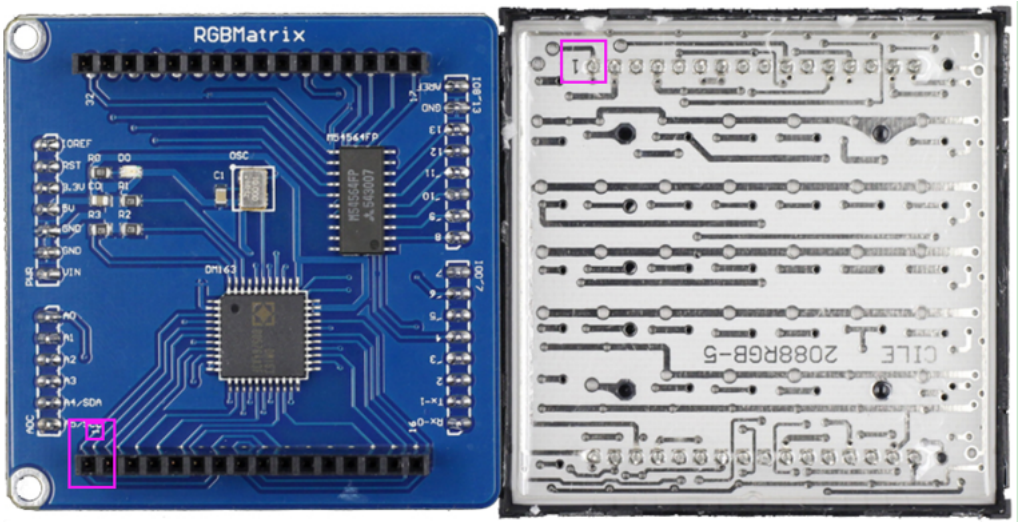
3. 1 X Switch Module

4. 1 X LCD

5. Sunfounder RGB LED matrix ($19.99 from Amazon)

Below is the schematic of the implementation of the project.


1 2 3 A
4 5 6 B
7 8 9 C
* 0 # D
UNO
ARDUINO
POWER
ANALOG IN
DIGITAL (PWM~)


RGBMatrix
OSC
VIN
A4/SDA

The first diagram is created using Tinkercad while the second diagram is taken from Sunfounder Wiki page for "Full Color RGB LED Matrix Driver Shield + RGB Matrix Screen." The RGB matrix screen is attached to the driver shield (the product contains the matrix screen and the driver shield). The driver shield is then connected to the its corresponding arduino pins. Since the shield takes up 10 digital pins and 3 analog pins of the arduino, another arduino is added to implement the input hardware. Since inputs are first sent to the top arduino which then sends the input to the bottom arduino, the top is called the master and the bottom is called the slave arduino. An LCD is attached to the master to let the players select their checker (LED color) and to show the game status in real time.

3 Optional Implementations

After the successful implementation of the human players, the further goals are to implement an AI which lets a human player play against a bot. Furthermore, the future plans include the extension of input methods so that two human players could play the game by communicating with the arduino through the internet.