CAOS Match4 Project

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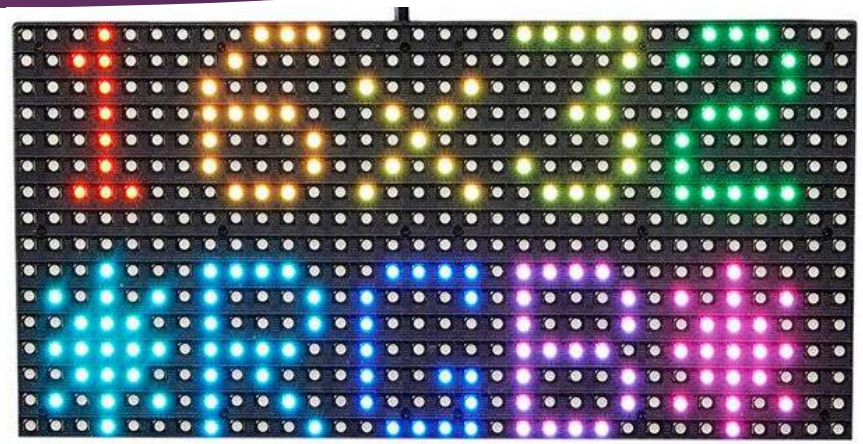
Our Goal

- Electronic Match4 Game
- Displayed on LED Matrix
- Controlled with 7 Buttons
- Inspired by arcade machines

Material used for the project

- Arduino Uno
- Adafruit LED 32x16 RGB Matrix
- Power supply for LED Matrix
- Red Buttons (SWITCH PUSH SPST-NO 16A 125V)
- Jumper Wires



The initial development plan

- Plan based on who has the Arduino at any given time:
  1. Daniel writes the code for the match 4 game in C
  2. Tim orders and assembles all the parts
  3. Tim tests Daniels code with the Arduino and handles the input of the game
  4. Daniel handles the output of the game and finishes up the project

- Goal: Project finished before 2019 starts

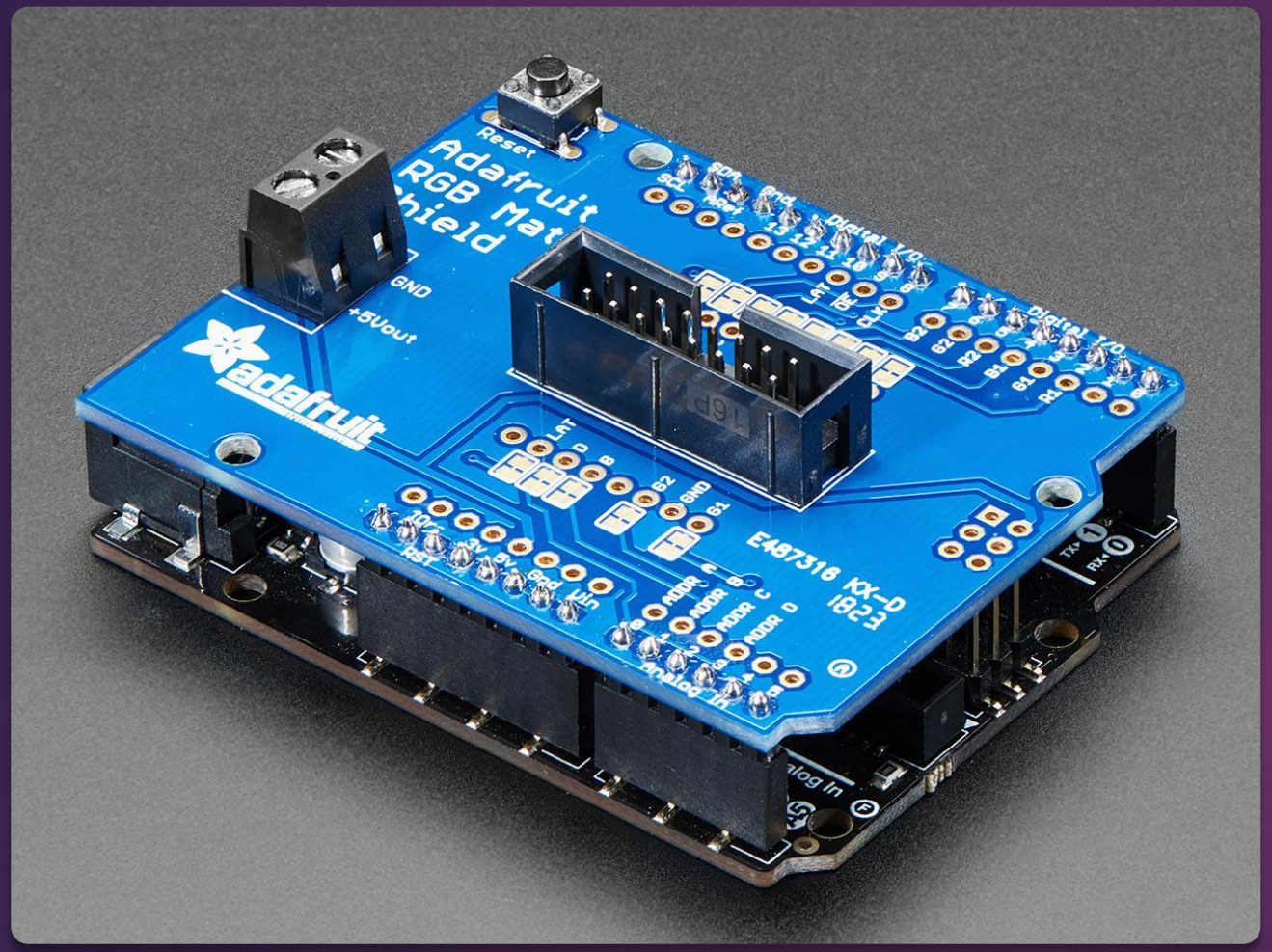
Writing the match4 Code

- Code written in C
- Goal: get playable version of the game on console first
- Relatively simple
- A lot of issues with the code when trying to get it onto the Arduino

The assembly

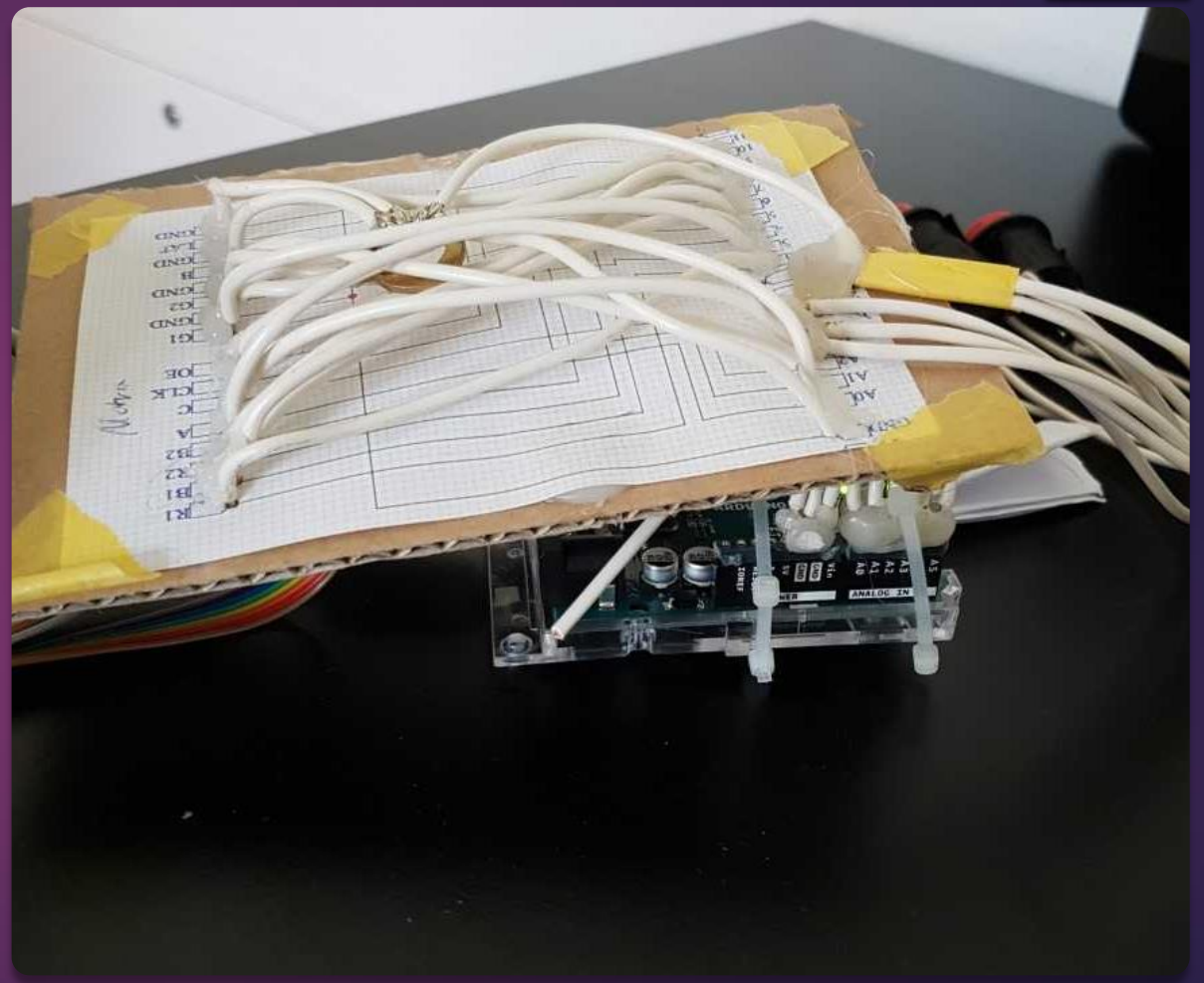
- In theory it should have been easy
- In practice we had a lot of issues:
  1. No power supply for the LED Matrix, assembly delayed
  2. Connecting LED Matrix difficult due to different pin layouts
  3. Not enough Ports on the Arduino to connect the 7 buttons, had to make it work with just 3

Connecting the LED Matrix

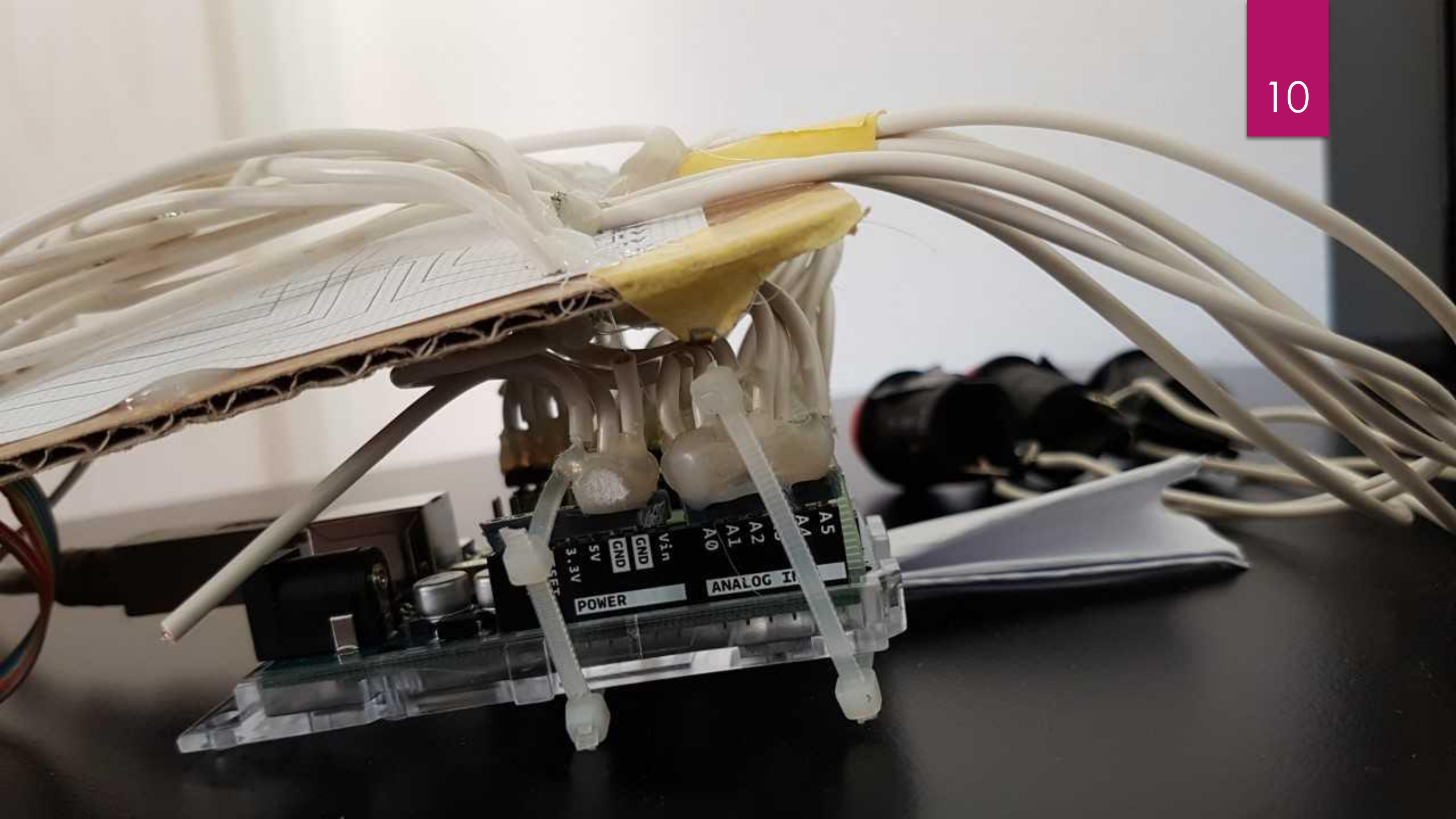


We probably should have bought this but we didn't….

…so we had to make it ourselves



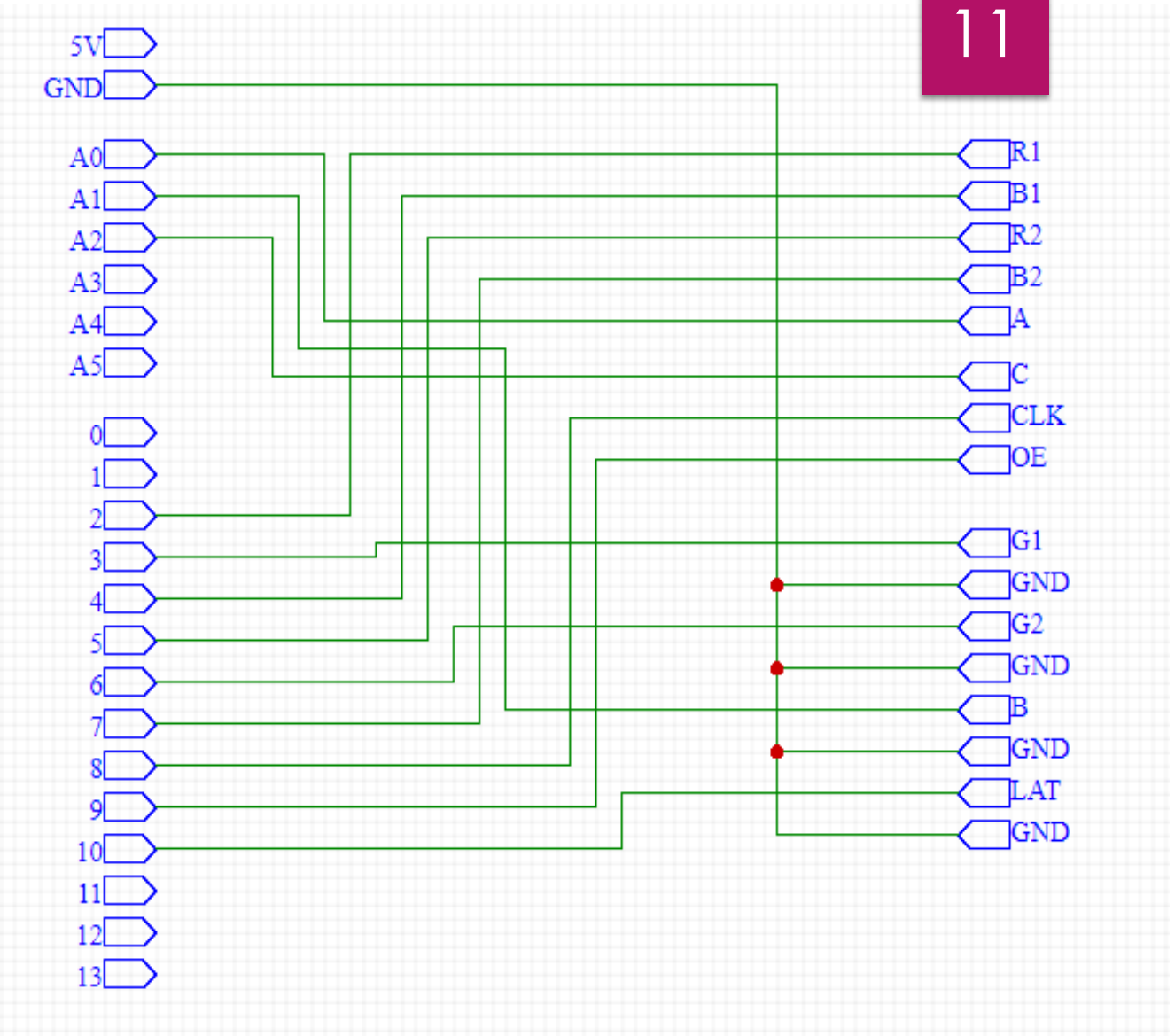
GND
LAT
GND
B
GND
G2
GND
G1
OE
CLK
C
A
B2
R2
B1
R1
11
10
9
8
7
6
5
4
3
2
1
A4
A3
A2
A1
A0
GND


3.3V
5V
GND
GND
Vin
A0
A1
A2
A5
POWER
ANALOG

Schematics

Connection from the Arduino to the LED Matrix

- Arduino on the left
- LED Matrix on the right



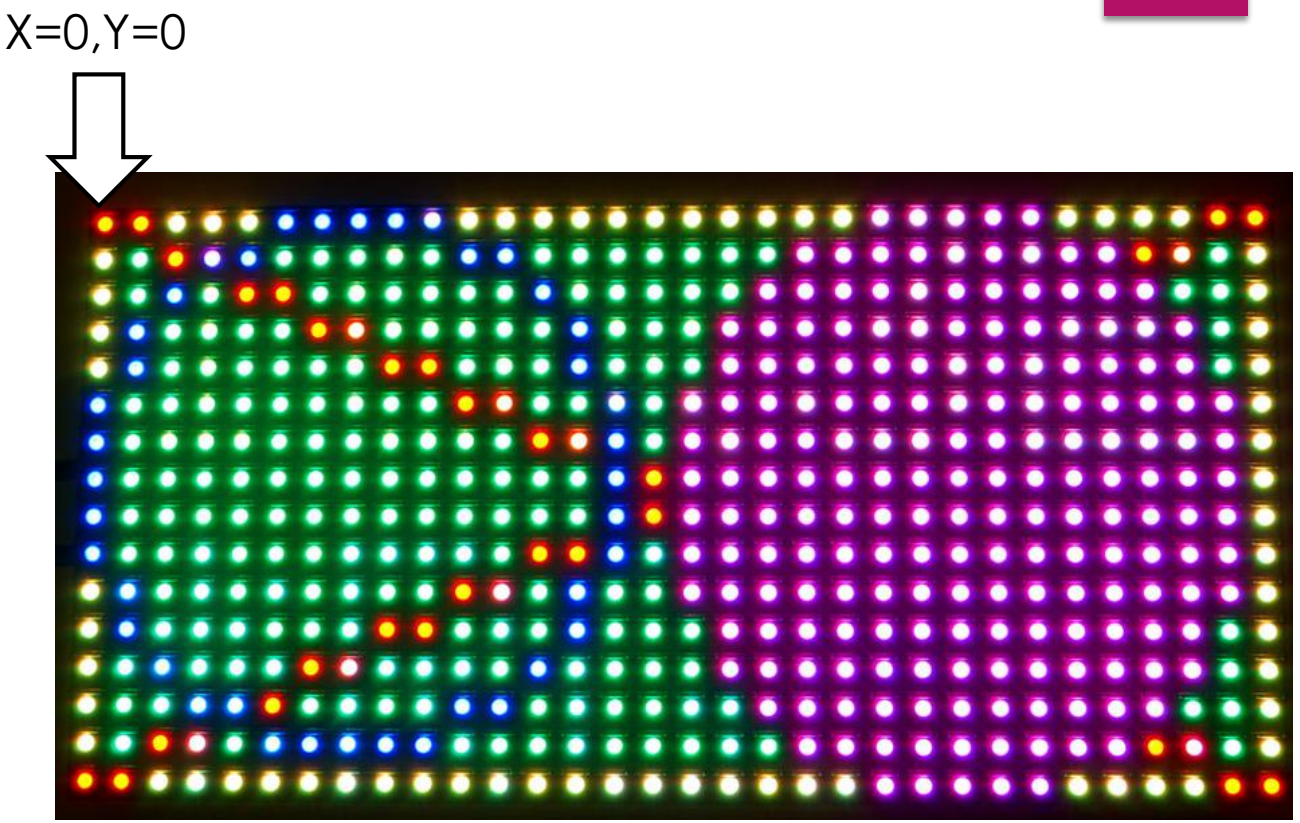
Making the Input work

- Buttons work slightly different than the buttons we experimented with during the CAOS exercises:
- Only two pins
- Connected to analog pins
  - (no other pins free)

Using the LED Matrix

- Matrix manufacturer (Adafruit) offers a code Library to use the matrix
- Using the Matrix, once connected, fairly straight forward
- Code Example:

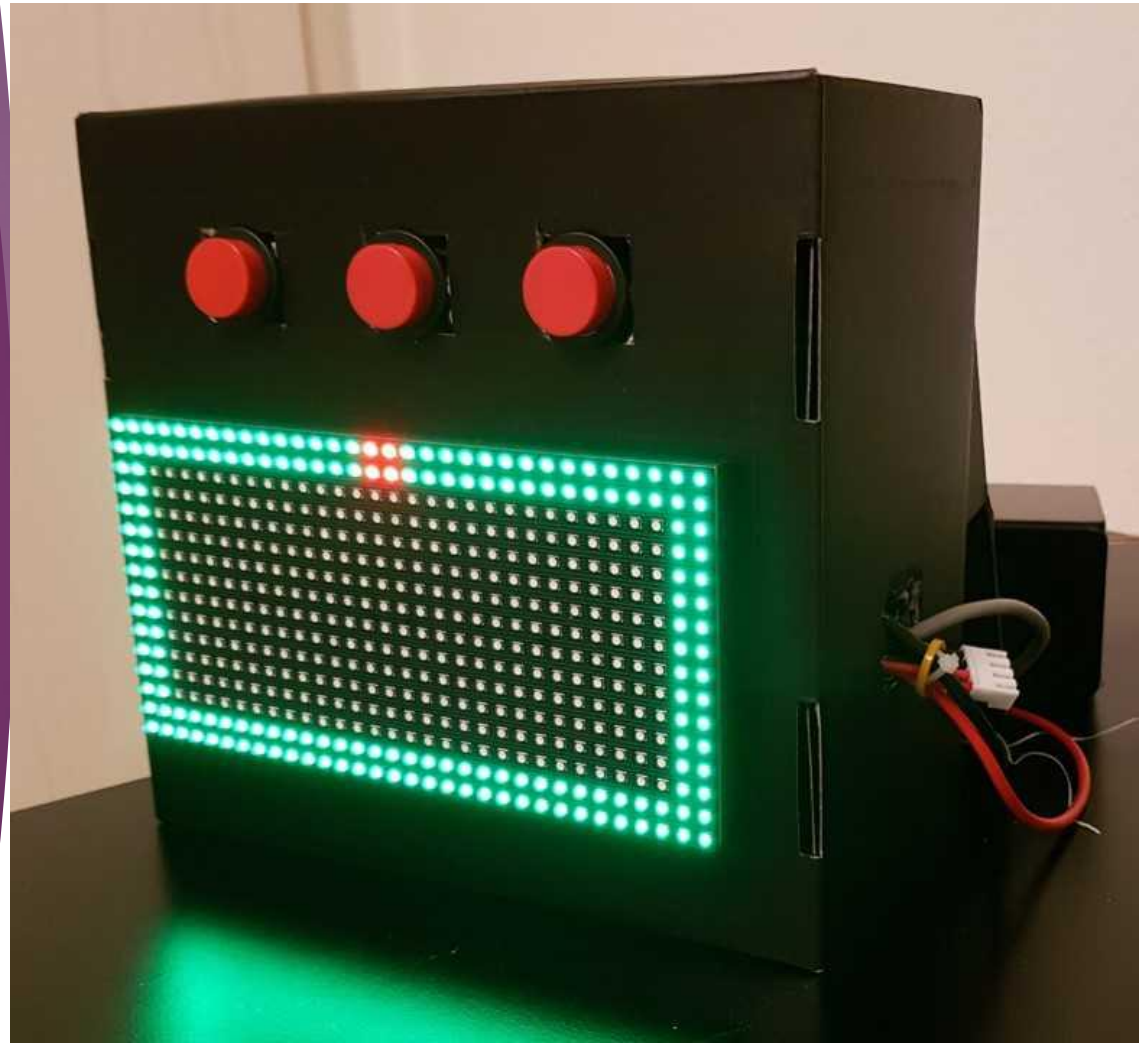
```
drawPixel(
      xPosition,
      yPosition,
      RGB);
```



Getting the Match4 code on the Arduino

- Code used too much memory for the Arduino, it had to be heavily altered:
  1. A lot of Data types were changed to “signed char” to save memory
  2. Code was simplified
- Since the code assumed there would be 7 Buttons, it had to be adjusted to work with 3 Buttons
- A lot of time/effort spent rewriting the code

The finished Product



Live Demo

Reflecting on the Development

- A lot of things went wrong:
  1. Poor planning and research
  2. We did not manage to follow our desired development schedule
  3. Original code for the game did not work well with the Arduino
- But a lot of thing went well too:
  1. The initial goal we set to achieve was accomplished
  2. We learned a lot of things during the development

What we learned

- Buy parts as fast as possible, unpredictable delivery times can mess everything up
- Do thorough research FIRST, no surprises/missing parts during assembly
- Write code with the System in mind on which the code will be running on
- We learned a lot about memory management

Questions?