

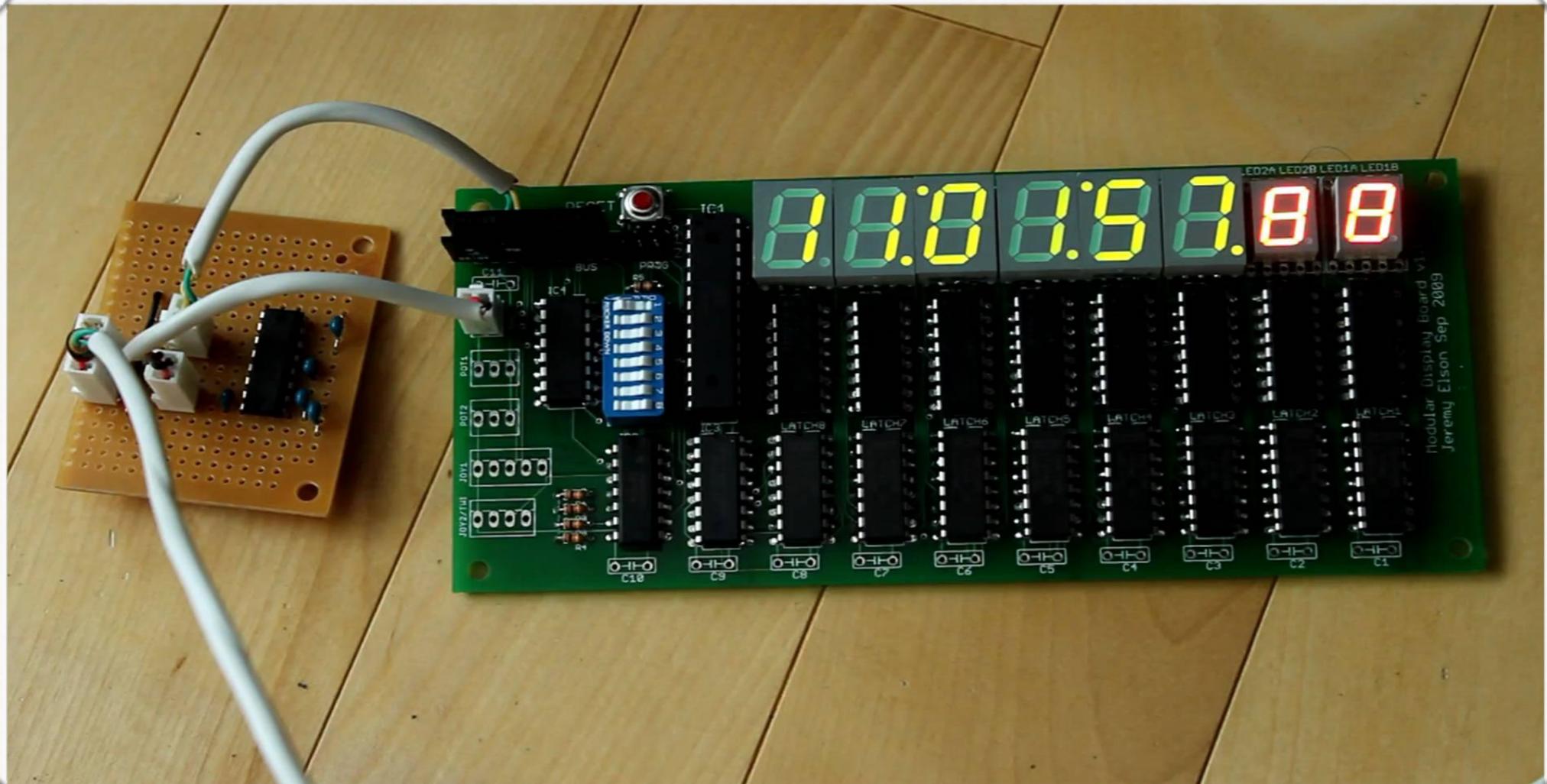


INTRODUCTION TO ARDUINO

Prakhar Jawre, Electronics Club 2015-16

QUICK REVISION

- Difference between **Digital** and **Analog** electronics.
- What are ICs (Integrated Circuits)?
- Different ICs we got acquainted with-
 - 555 **Timer**
 - 4029 **Counter**
 - 7447 **Seven Segment Decoder.**
 - De/**Multiplexers** - De/**Encoders**
 - and lots of **logic gates.**



- We created a simple clock.
- The clock was made of various modules/ ICs
- For different applications we need different ICs
- What if we had an IC which can be used in many applications, just by reprogramming it.

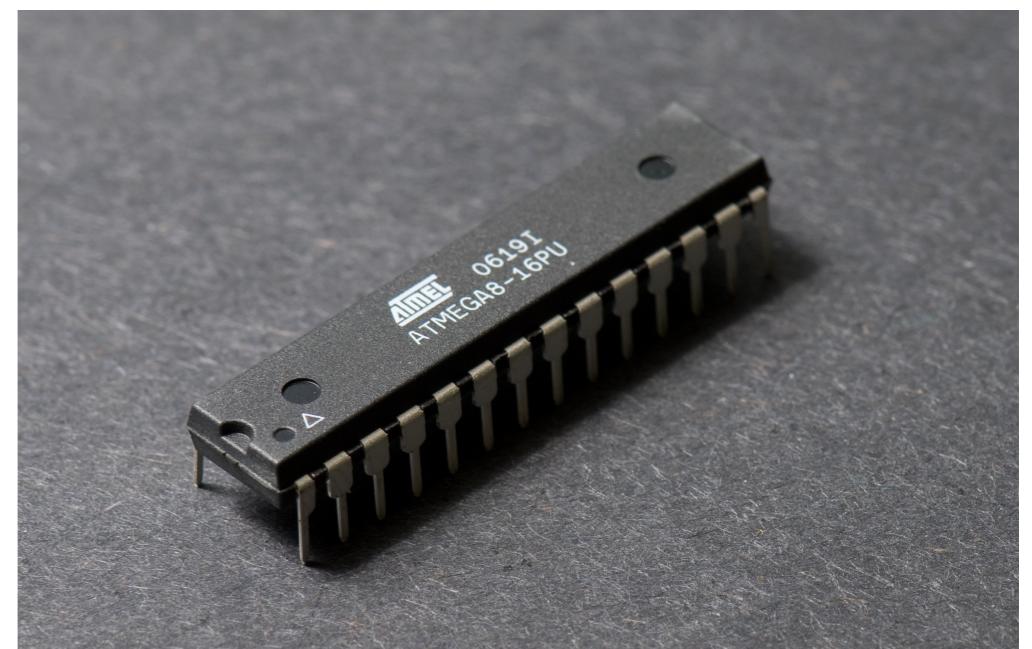
MICRO CONTROLLERS

It is a small computer on a single IC used in various applications.

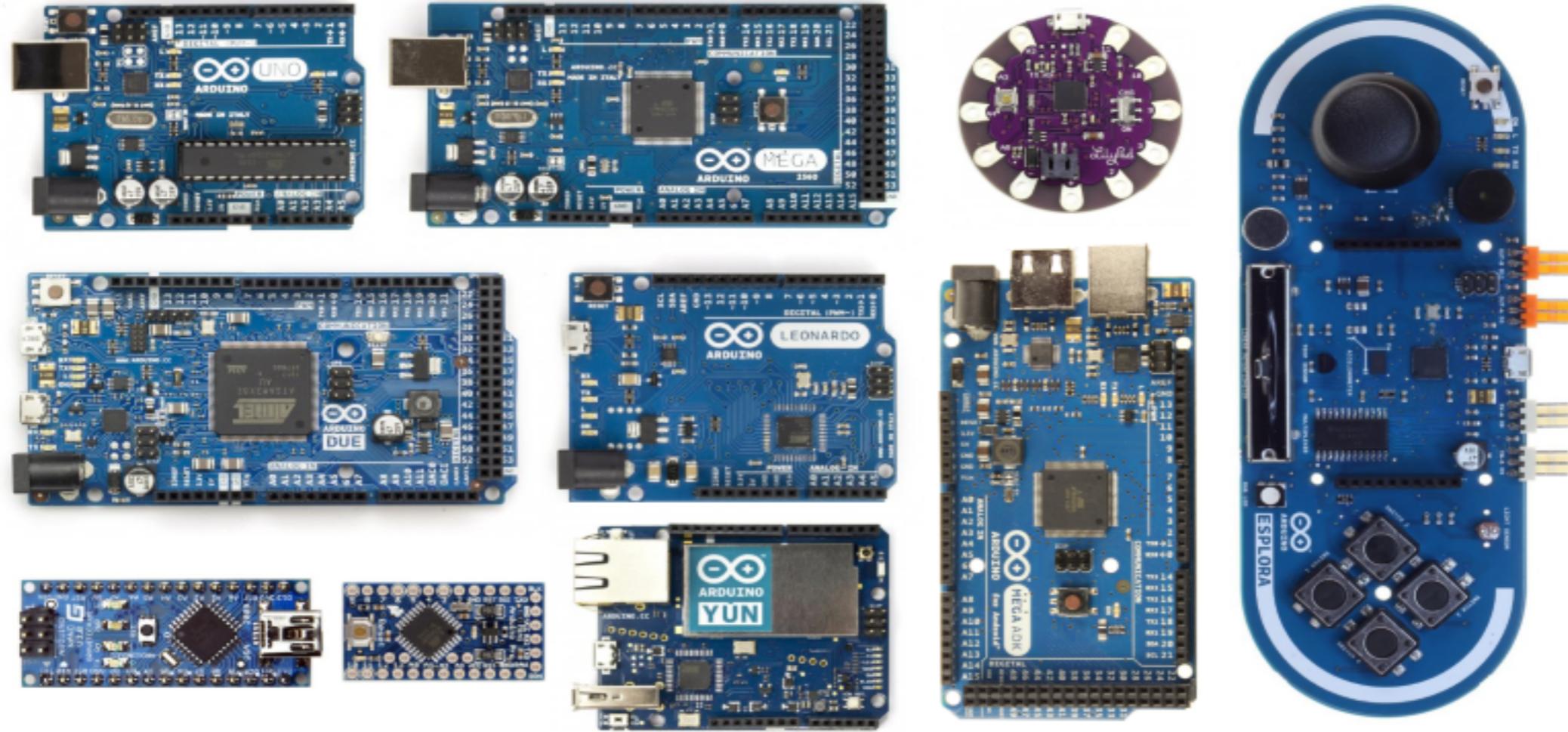


ATMEGA MICRO CONTROLLERS

A very popular micro controller series, generally used by many electronics hobbyist around the world.

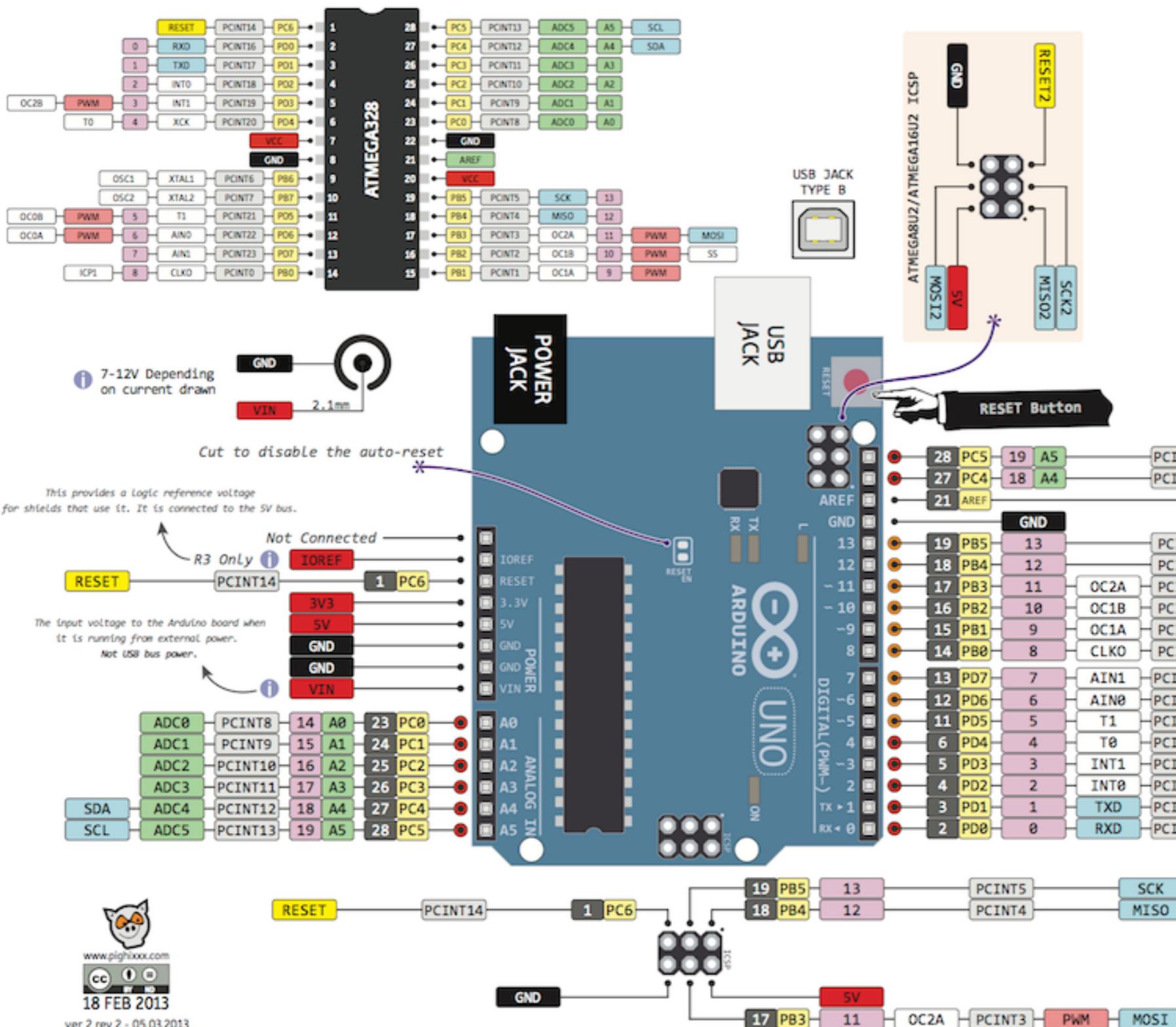


ARDUINO



- Arduino is an electronic development platform, build around **ATmega** micro controllers.
- It makes micro controller based electronic project development very easy.
- It has a **highly active user community** around the world, so you'll never stuck in any problem.

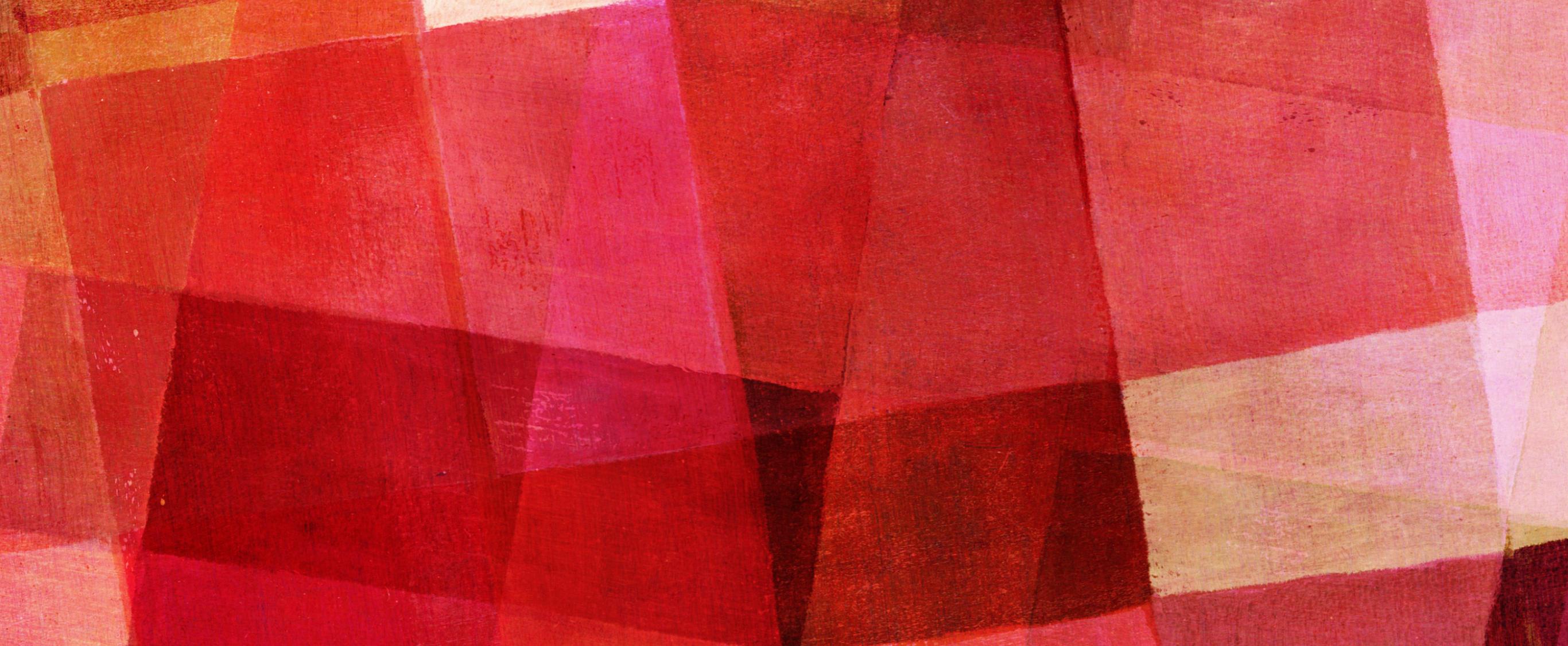
ARDUINO UNO



THE DEFINITIVE ARDUINO UNO PINOUT DIAGRAM

LET'S GET OUR HANDS DIRTY

please open <https://123d.circuits.io>



ELECTROMANIA'16 PROBLEM STATEMENT DISCUSSION

Prakhar Jawre, Electronics Club 2015-16

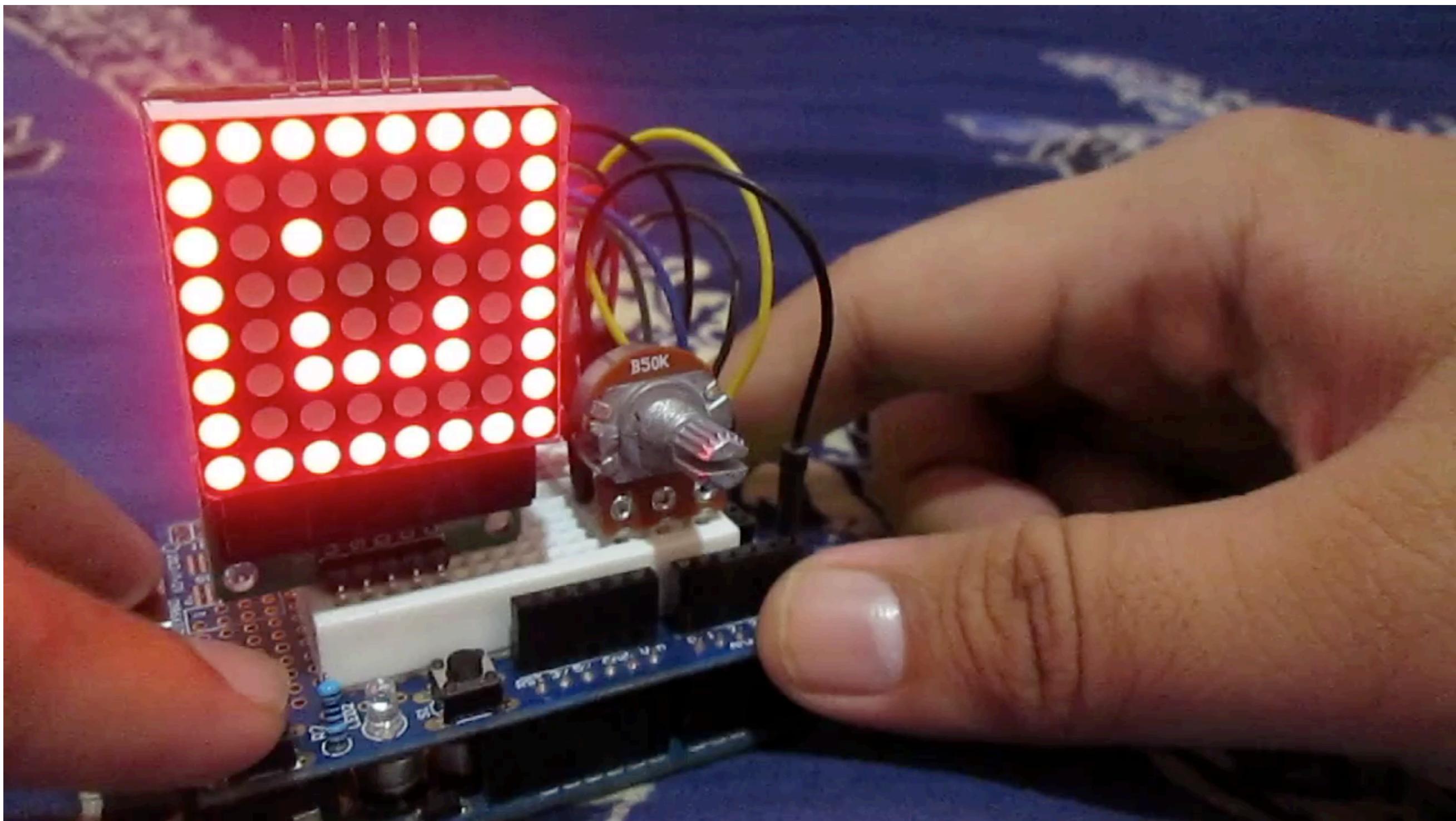
PROBLEM STATEMENT

- The objective is to design a 2D “Break the Bricks” game using a **self-fabricated LED Matrix** as the display and the game will be played by buttons/self-fabricated handheld joystick.

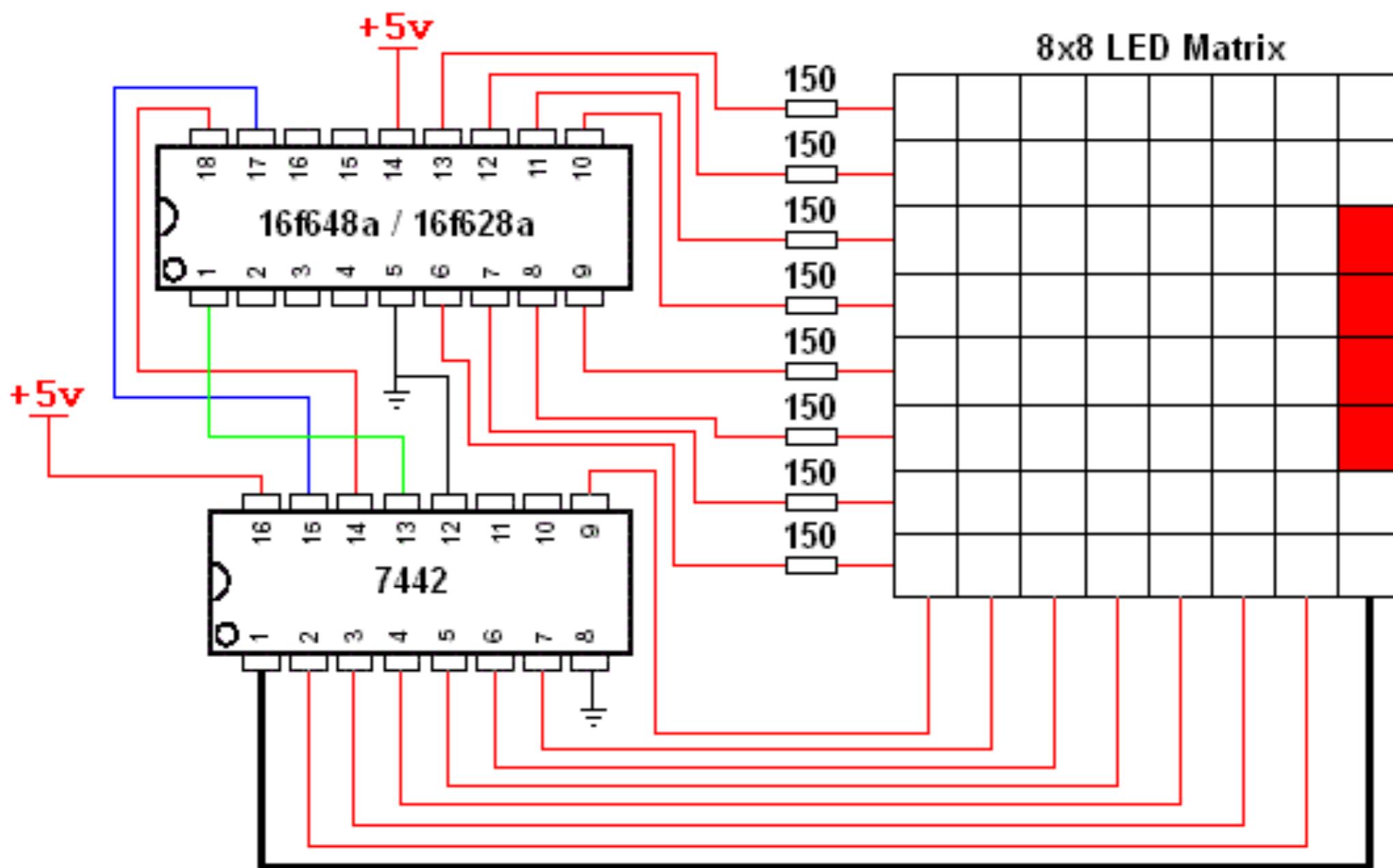
COMPULSORY TASKS

- A self-fabricated LED matrix of minimum size 8x8 will be used for display. A particular pattern of 3-4 glowing LEDs should be used to represent the paddle (to reflect the ball).
- One can either use a switches/handheld joystick to move the controlled paddle left or right.
- Bricks will be represented by a different pattern of glowing LED.
- When ball hit the paddle, or side walls, it should rebound back . When ball hit the brick, ball should reflect back and brick should be destroyed.
- Aim of the game is to protect the ball from colliding with the ground as well as to destroy the bricks. Any other extra feature can also be implemented. Note that though the extra features contain a significant portion of the allocated marks, but they would be taken into consideration only when the participant team has fully implemented the compulsory tasks.

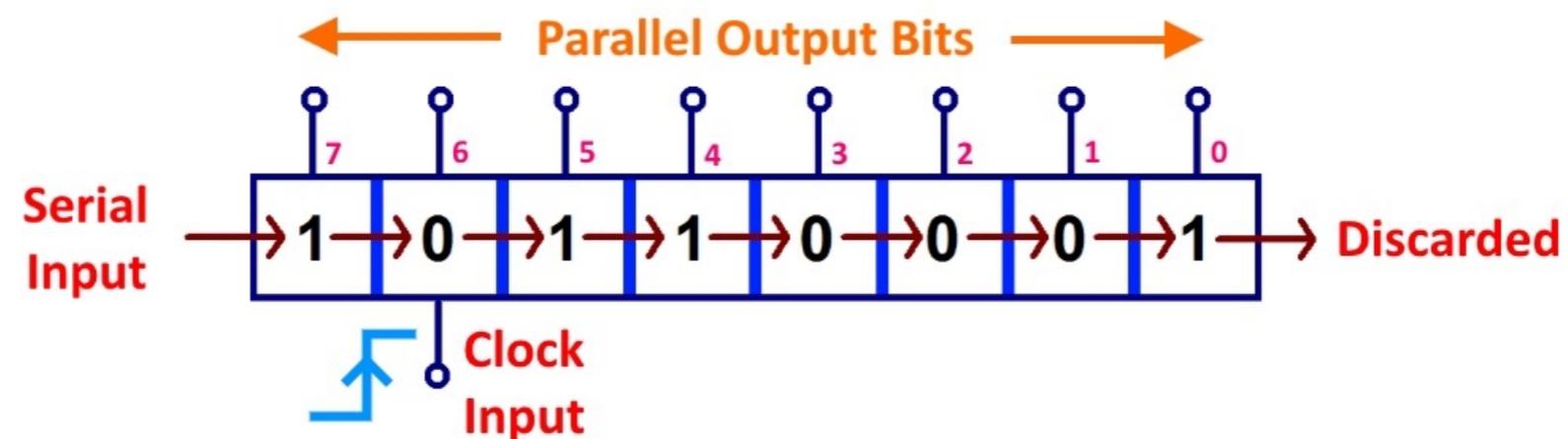
SOMETHING LIKE THIS..



HOW TO MAKE LED MATRIX



HOW TO MAKE LED MATRIX

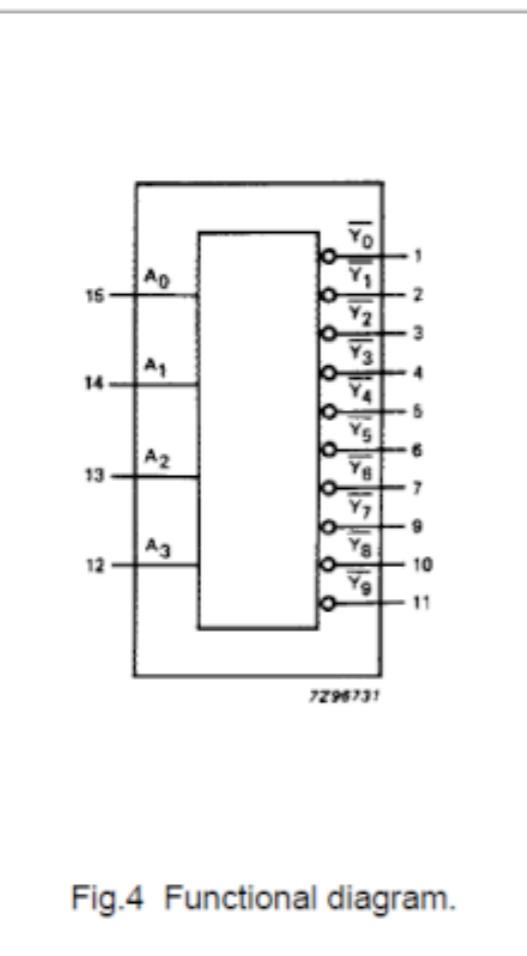


8 bit shift register

HOW TO MAKE LED MATRIX

BCD to decimal decoder (1-of-10)

74HC/HCT42



FUNCTION TABLE

INPUTS				OUTPUTS									
A ₃	A ₂	A ₁	A ₀	Ȳ ₀	Ȳ ₁	Ȳ ₂	Ȳ ₃	Ȳ ₄	Ȳ ₅	Ȳ ₆	Ȳ ₇	Ȳ ₈	Ȳ ₉
L	L	L	L	L	H	H	H	H	H	H	H	H	H
L	L	L	H	H	L	H	H	H	H	H	H	H	H
L	L	H	L	H	H	L	H	H	H	H	H	H	H
L	L	H	H	H	H	H	L	H	H	H	H	H	H
L	H	L	L	H	H	H	H	L	H	H	H	H	H
L	H	L	H	H	H	H	H	L	H	H	H	H	H
L	H	H	L	H	H	H	H	H	L	H	H	H	H
L	H	H	H	H	H	H	H	H	H	L	H	H	H
H	L	L	L	H	H	H	H	H	H	H	H	L	H
H	L	L	H	H	H	H	H	H	H	H	H	H	L
H	L	H	L	H	H	H	H	H	H	H	H	H	H
H	L	H	H	H	H	H	H	H	H	H	H	H	H
H	H	L	L	H	H	H	H	H	H	H	H	H	H
H	H	L	H	H	H	H	H	H	H	H	H	H	H
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H	H	H	H	H	H	H	H	H	H	H	H	H	H

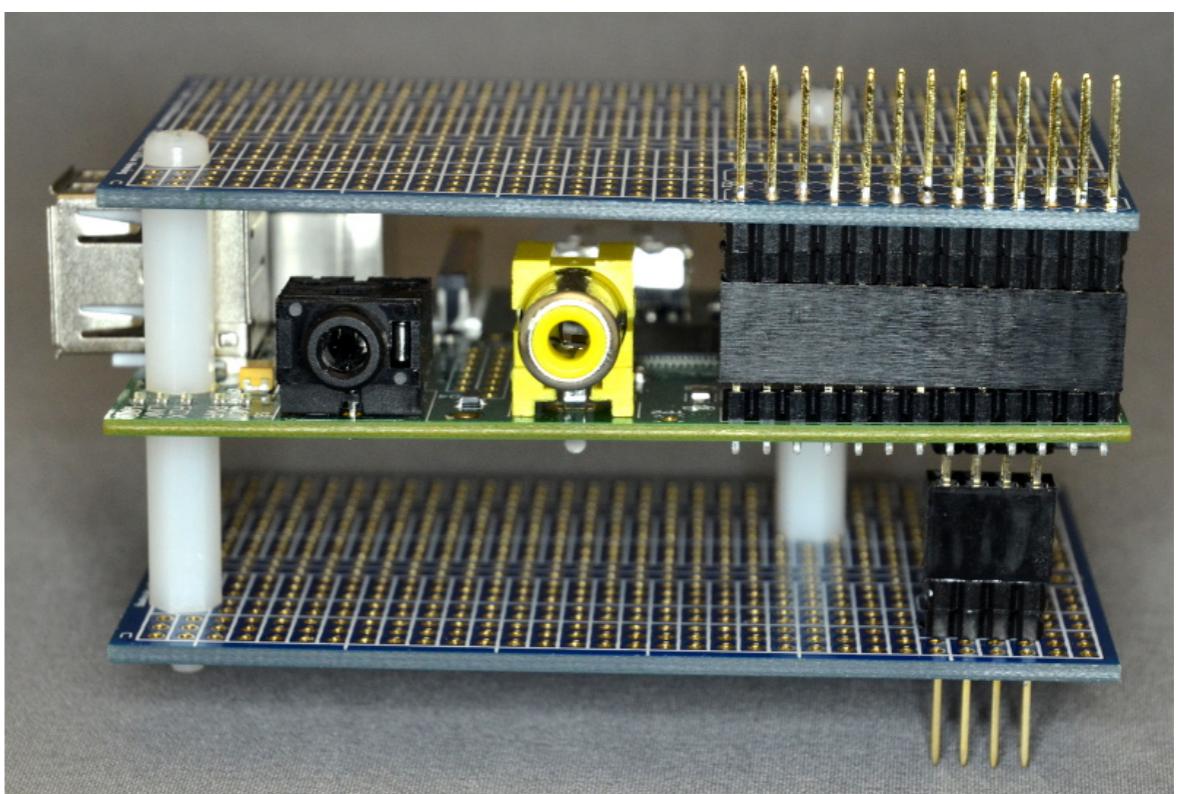
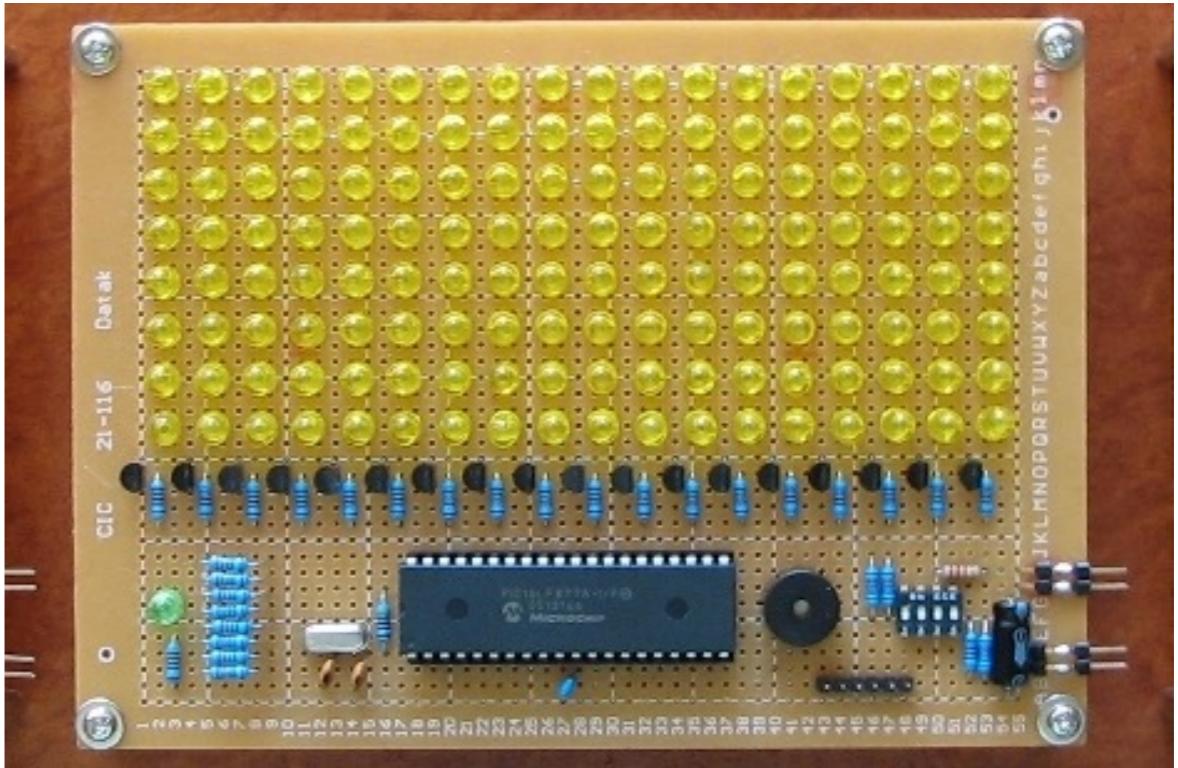
Note

1. H = HIGH voltage level
L = LOW voltage level

Binary to Decimal decoder

PROPER LAYOUT OF COMPONENTS ON GPB

- Clean soldering.
- Careful with pins of Arduino, always lookout for short circuits and wrong connections.
- Boards can be stacked over each other.



CLUB ETIQUETTE

- Always keep the club clean.
- You are not allowed to take any tool outside the club.
- Switch off soldering iron after use.
- Put the components back to their place after use.
- Use the resources wisely.

THANK YOU!