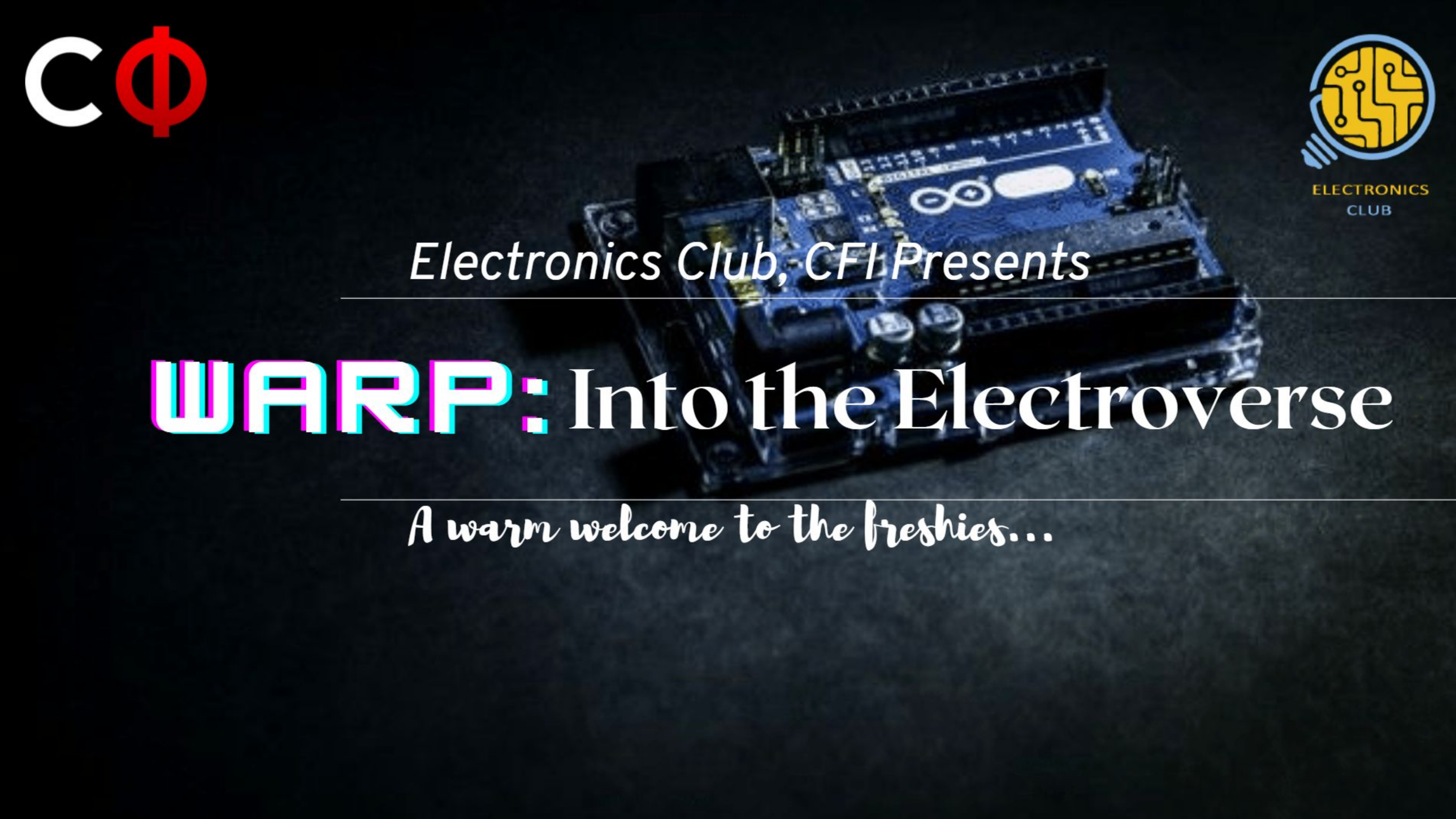

Electronics Club, CFI Presents

WARP: Into the Electroverse

A warm welcome to the freshies...

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What's in for you?

1. Who we are and what we do?
2. Introduction to Arduino
3. Exciting projects on TinkerCad!
    a. Blinking LED
    b. Gas sensor
    c. LCD Display

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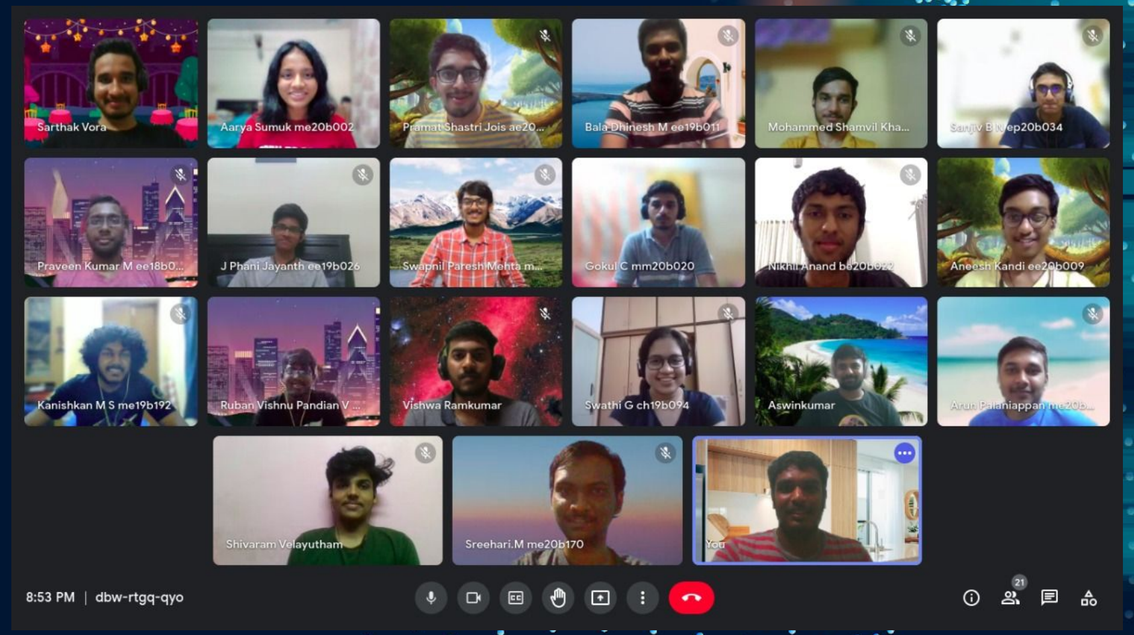
Who are we?

We are a group of enthusiasts exploring the huge ocean of electronic domains such as IoT, Embedded Systems, FPGA Programming, ML and Robotics.



Our Team

7 cores

12 coordinators

50 Project Members

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What do we do?

- 7 projects affiliated with CFI
- A variety of sessions and events planned throughout the year
- Research projects across domains
  - Robotics
  - Machine Learning
  - Digital Design
  - Signals and Communication
- Participating in various competitions

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Club Culture

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Our Projects

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EC01 - Bird Diverter

- Employed to reduce wildlife mortality due to energy infrastructure.
- Economical and deployable.
- Collaboration with Wildlife Institute of India (WII).

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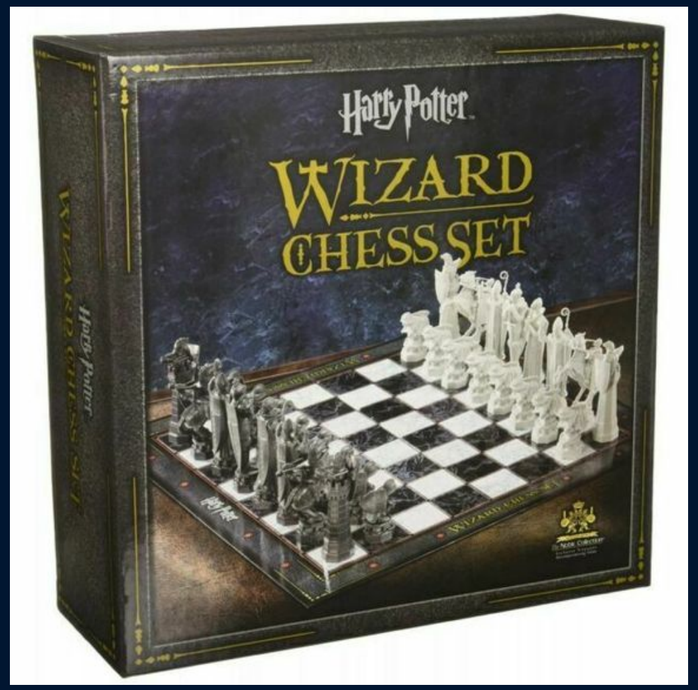
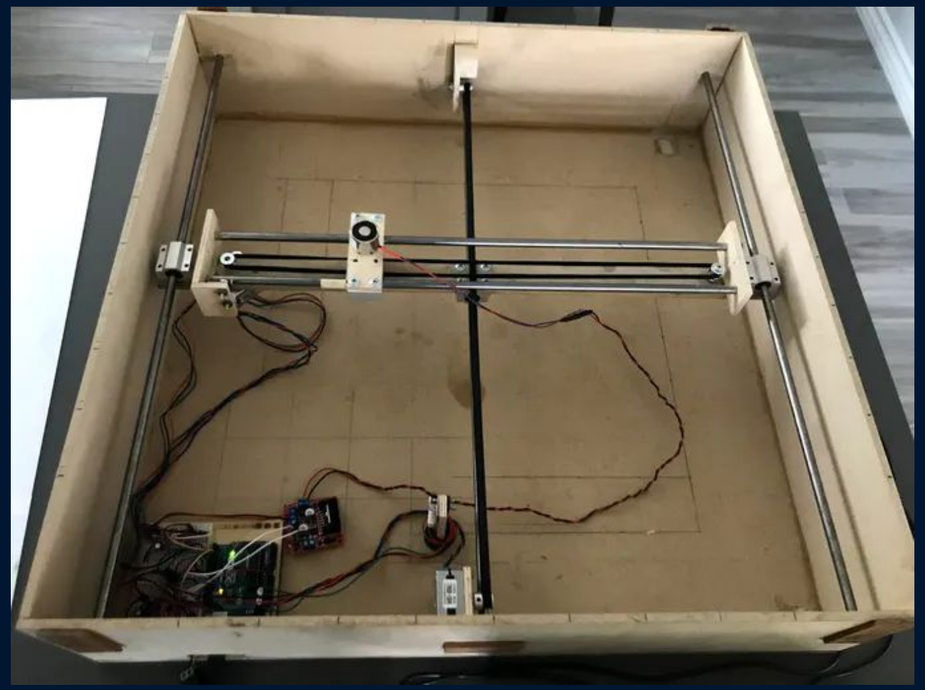
EC02 - Hogwarts Chessboard

- An automatic chessboard that allows you to play with anyone around the world.
- You can also introspect your skills with an inbuilt chess engine!





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EC03 - Accelerator for Ray Tracing

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- ART is utilized in Graphic Design, 3D Rendering, and Game Development using FPGAs.
- The project deals with hardware implementation of quick and accurate Ray Tracing.

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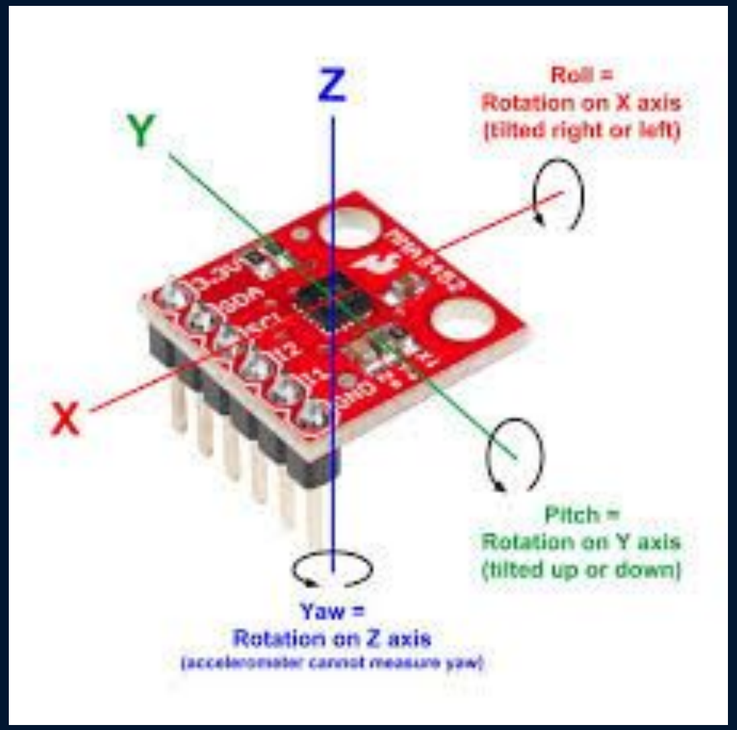
EC04 - Digital Pen

- A pen that transfers handwritten notes into digital data, in real-time
- Portable, with real writing experience



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EC05 - Hardware Accelerator for Real-time Deep Learning

- Accelerating performance and efficiency of DL methods using FPGAs.
- Utilizing the versatile FPGAs for myriad of real-life applications.

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EC06 - Mountable Heads-Up Display for Helmets

- A wearable device based on HUD Technology.
- Projects navigational data in the line of sight of bikers for seamless navigation through modern-day metropolitan traffic.
- Collaboration with Product Design Club (PDC).

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EC07 - Smart Spectacles for Auditorily Impaired

- Aids the auditorily impaired with their day-to-day navigation.
- Alerting system through light signals.
- Collaboration with Sahaay.

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Let's get started!

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Introduction to Microcontrollers

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Definition

A **microcontroller** (**MCU** for *microcontroller unit*) is a small computer on a single metal-oxide-semiconductor (MOS) integrated circuit (IC) chip. A microcontroller contains one or more CPUs (processor cores) along with memory and programmable input/output peripherals. Program memory in the form of ferroelectric RAM, NOR flash or OTP ROM is also often included on chip, as well as a small amount of RAM. Microcontrollers are designed for embedded applications, in contrast to the microprocessors used in personal computers or other general purpose applications consisting of various discrete chips.

Source:Wikipedia

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Let’s get it clear

It is the brain of any circuit. There’s input and output devices and then there’s the data collected. So it is the job of the microcontroller to control the output peripherals based on certain parameters. These parameters are the instructions that we will be giving to it using code. So it is used to perform a task when given the right inputs.

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Microprocessor vs Microcontroller

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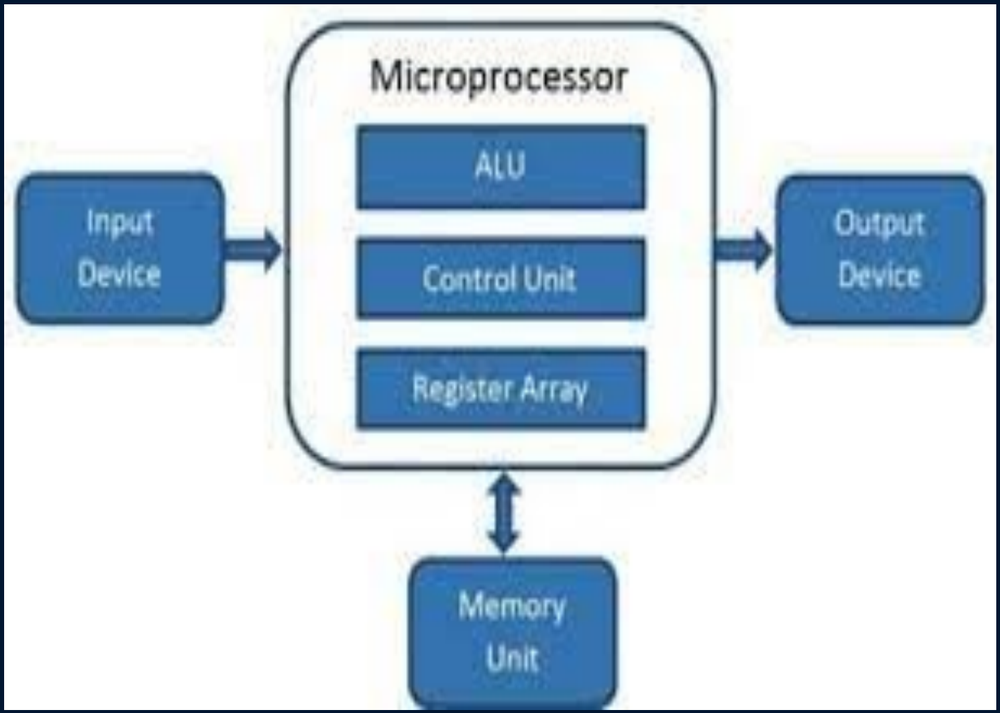
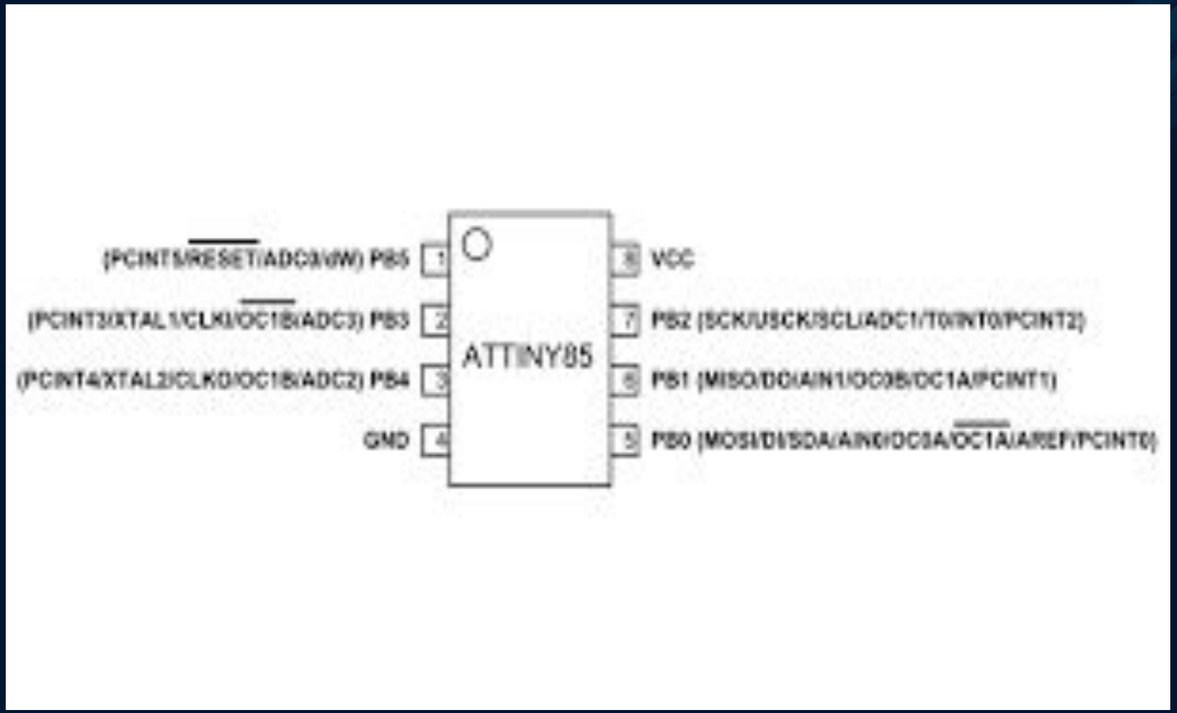
- The task is not predefined
- Contains only the CPU
- Complex and Expensive

- Performs one specific task
- Contains the CPU, memory, I/O
- Straightforward and inexpensive





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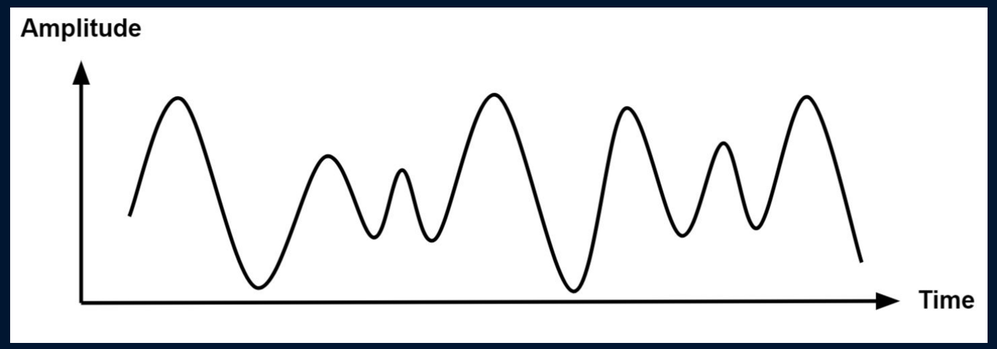
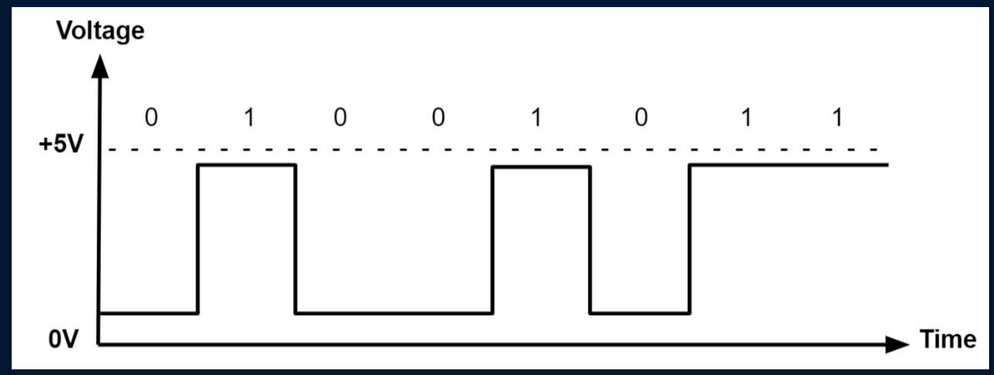
Analog

- An analog signal is a continuous signal that represents physical measurements.
- It is denoted by sine waves.
- It uses a continuous range of values that help you to represent information.
- Example : Temperature sensors, FM radio signals, Photocells, Light sensor, Resistive touch screen, etc.



Digital

- Digital signals are time separated signals which are generated using digital modulation.
- It is denoted by square waves
- It uses discrete 0 and 1 to represent information.
- Example : Computers, CDs, DVDs, etc.



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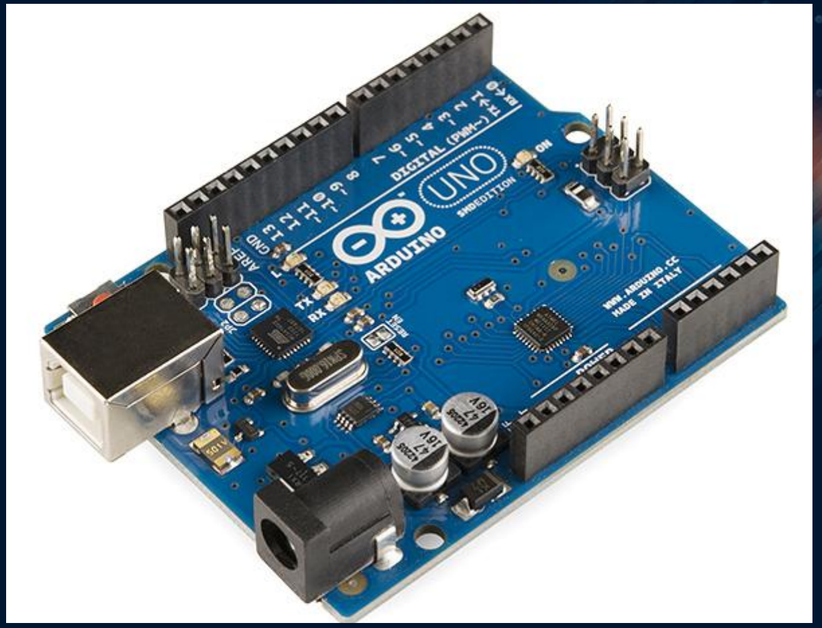
Introduction to Arduino

What is an Arduino?

Arduino is an open-source electronics platform based on easy-to-use hardware and software.

It consists of both a physical programmable circuit board (microcontroller) and a piece of software, or IDE, that runs on your computer, used to write and upload computer code to the physical board.



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Introduction to Arduino

Why do we use Arduino?

- Easy-to-use
- Flexible
- Open source
- Inexpensive

What can we do with an Arduino?

Arduino is a great tool for developing **interactive objects**, taking inputs from a variety of switches or sensors and controlling a variety of lights, motors and other outputs.

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Arduino Breakdown

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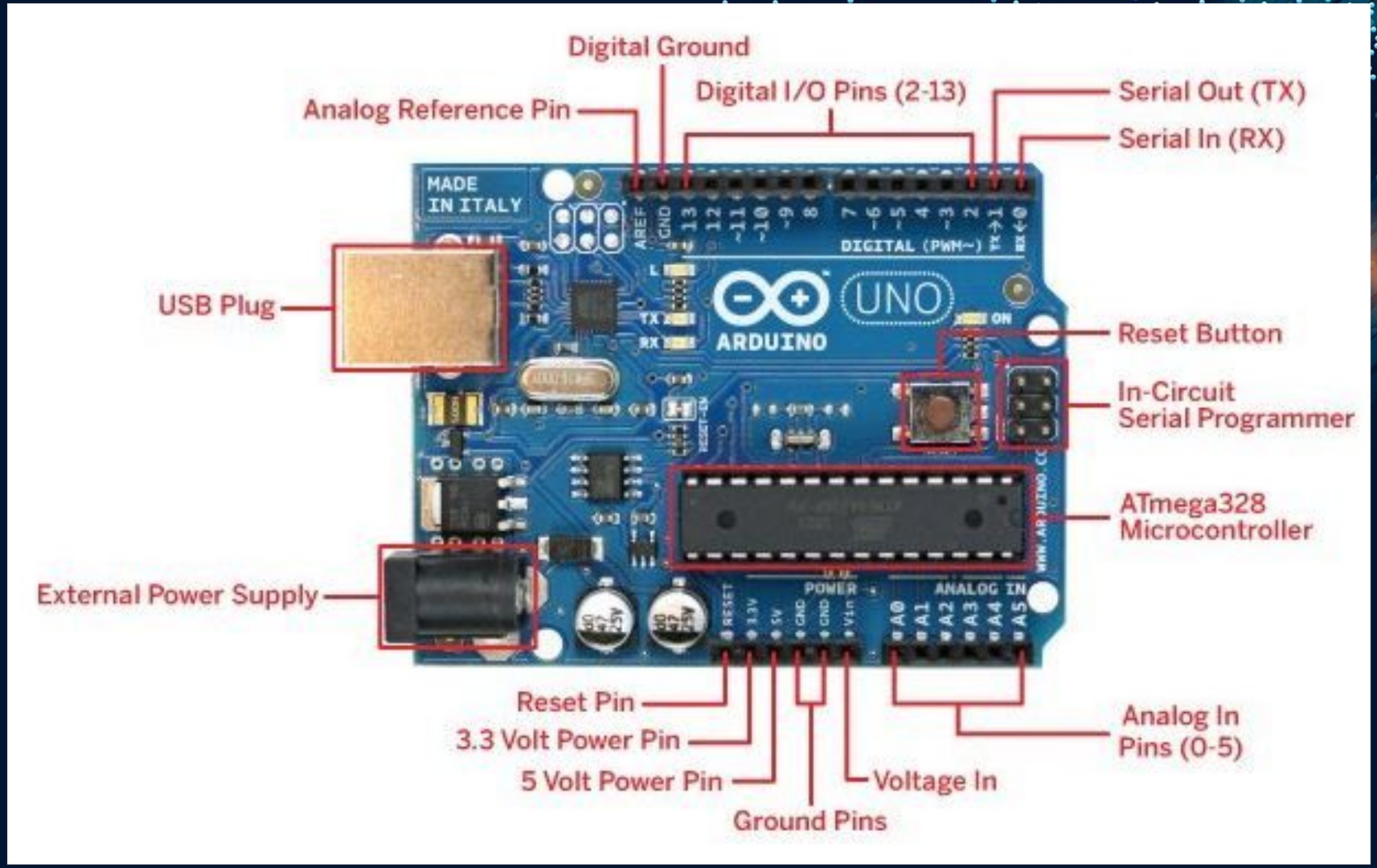
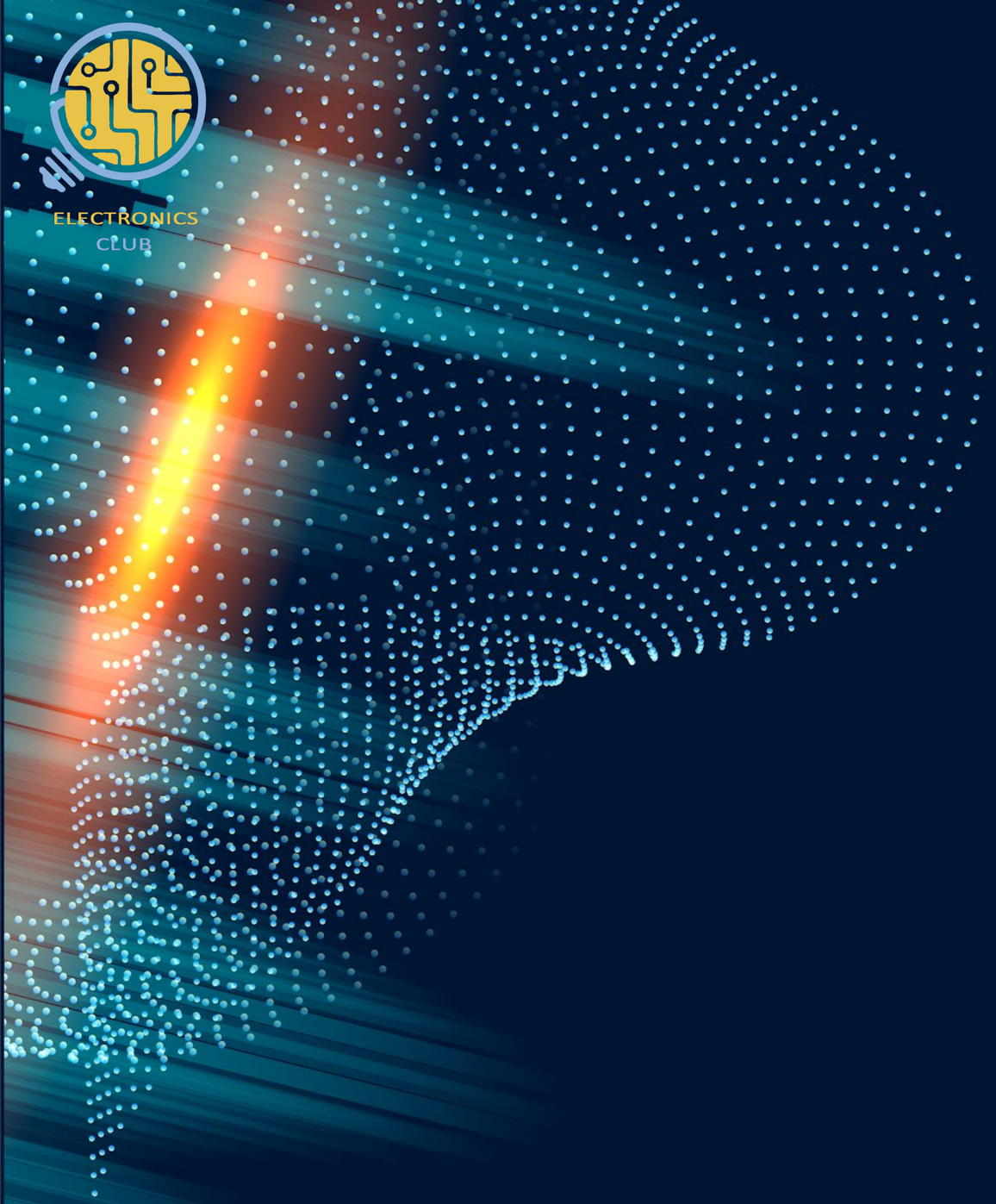
- Microcontroller: ATmega328p
- 14 Digital I/O Pins - 6 PWM
- 6 Analog Input Pins





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It’s time to TinkerCad

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Tinkercad

Tinkercad is a free, easy-to-use app for 3D design, electronics, and coding.

Next Steps:

1. Go to tinkercad.com/circuits
2. Launch Circuits
3. Create your account
4. Create a New Circuit

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Project-1 Blinking LED

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A Breadboard

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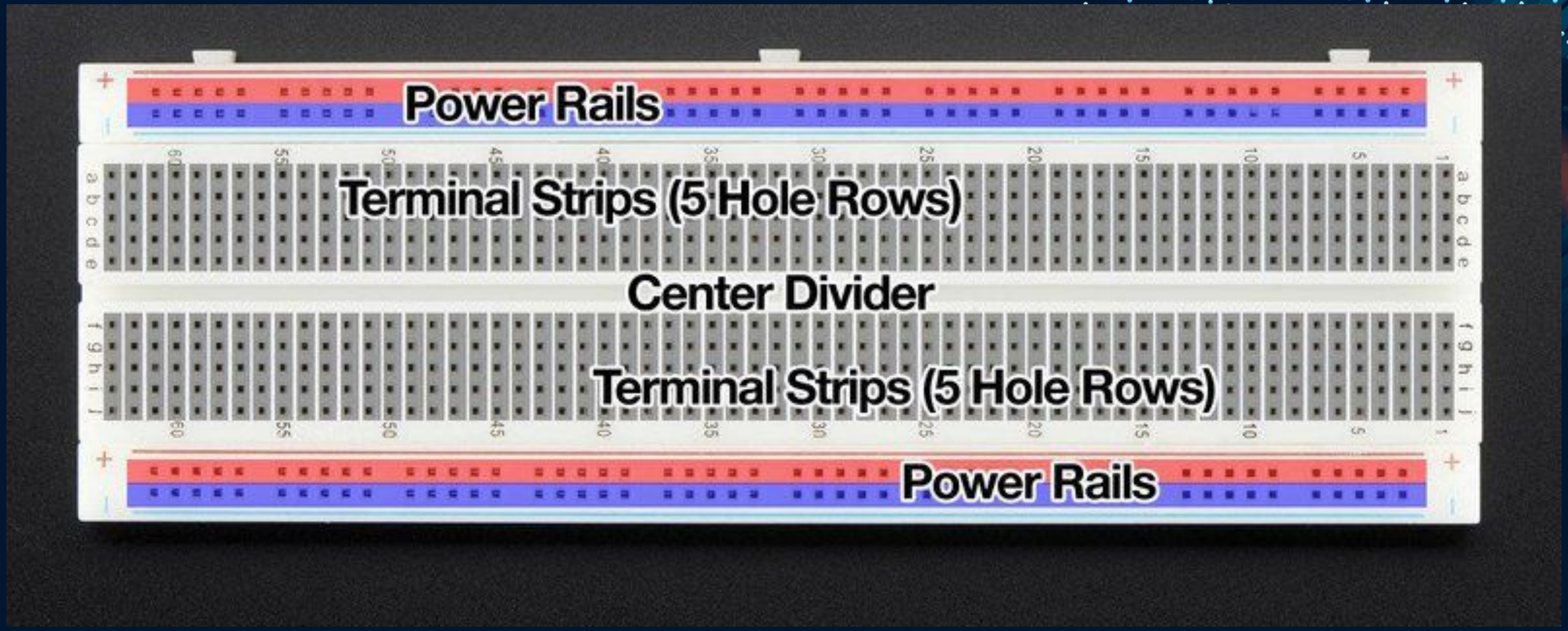

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Assembly and Code

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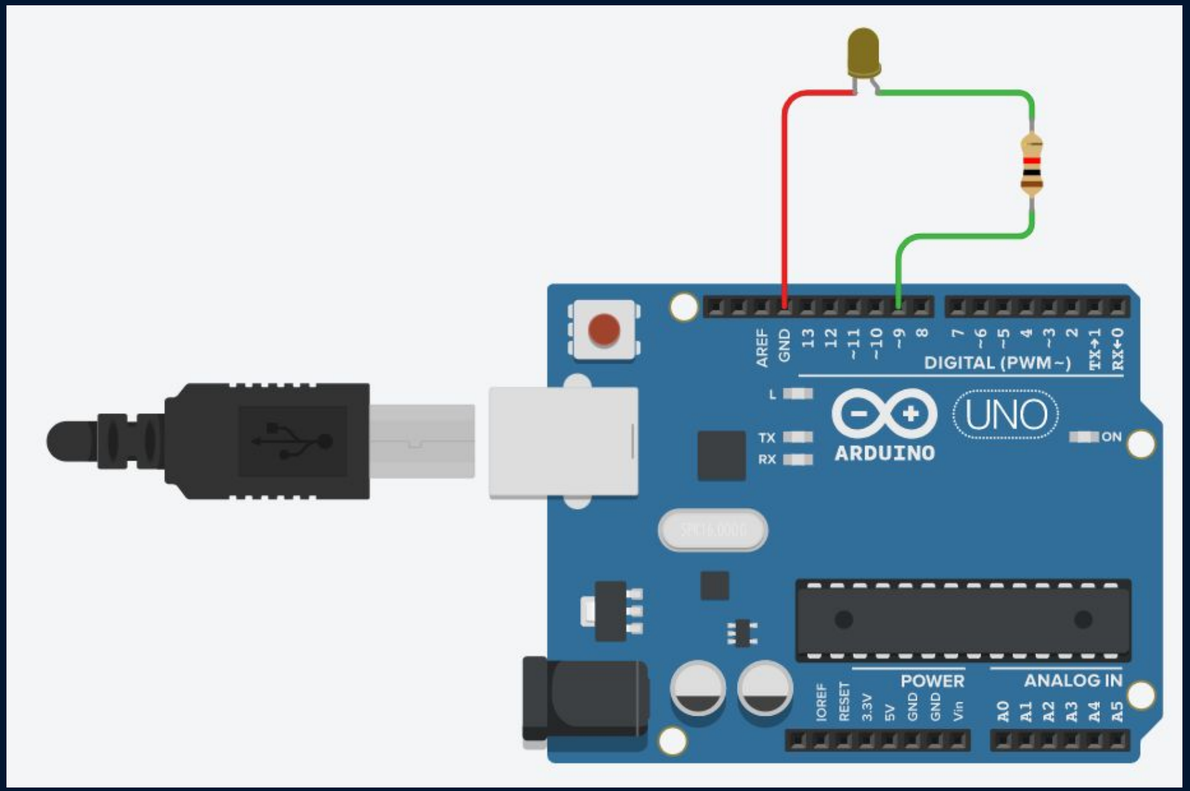

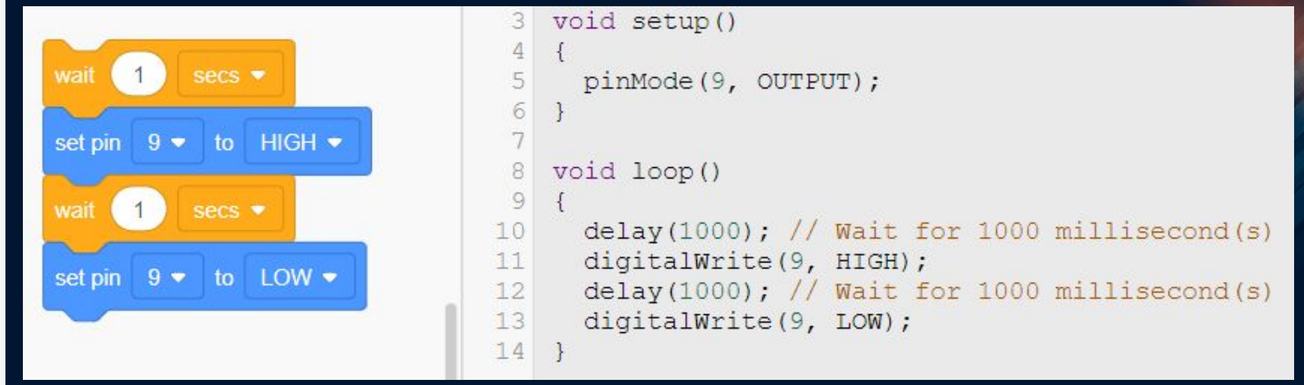


```
3  void setup()
4  {
5    pinMode(9, OUTPUT);
6  }
7
8  void loop()
9  {
10   delay(1000); // Wait for 1000 millisecond(s)
11   digitalWrite(9, HIGH);
12   delay(1000); // Wait for 1000 millisecond(s)
13   digitalWrite(9, LOW);
14 }
```

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Find the circuit design here: https://www.tinkercad.com/things/dpIH6ylzDn7

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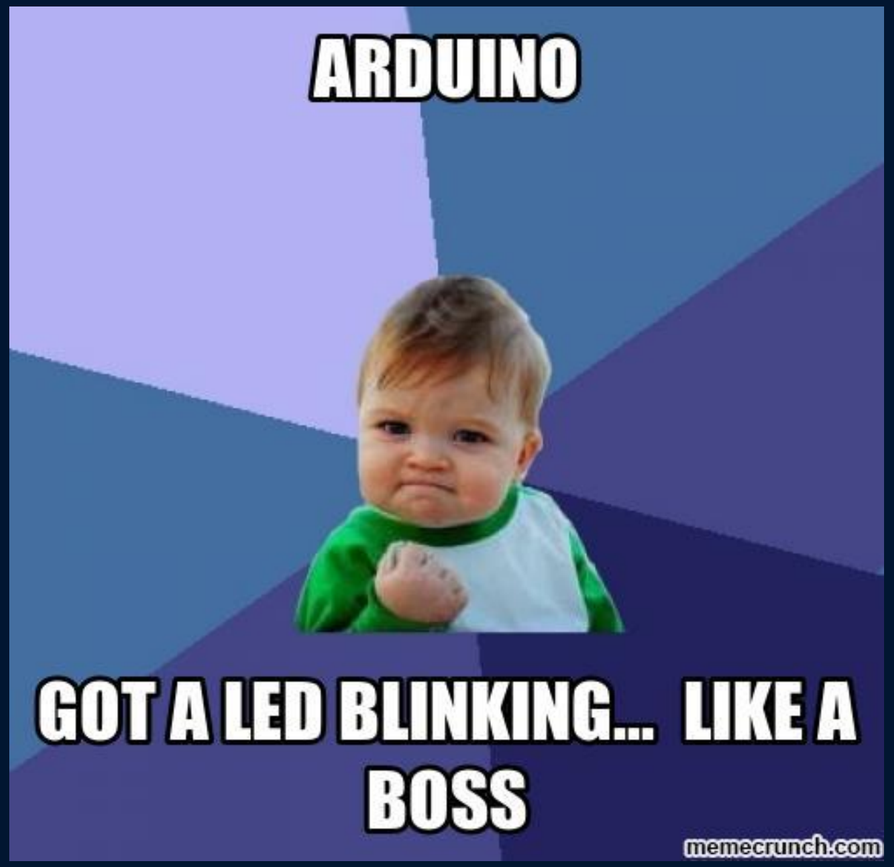

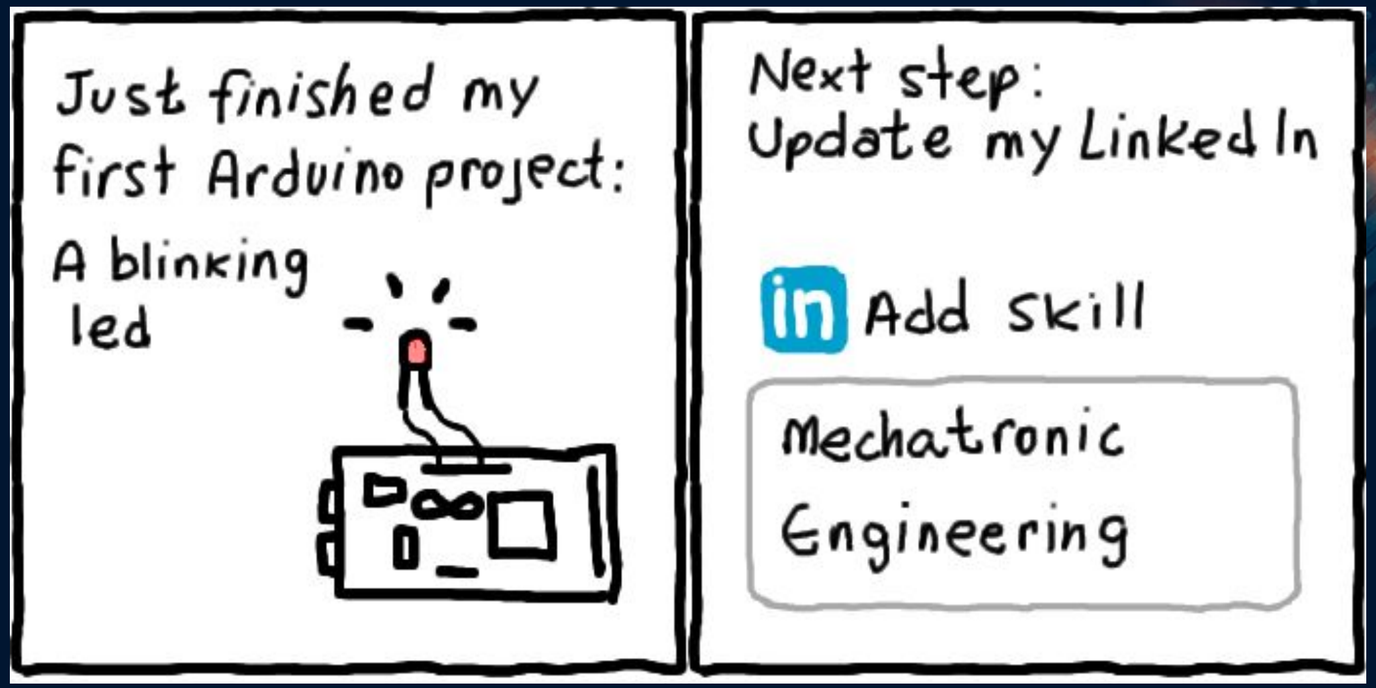

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Project-2
Smoke Detector

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Components Used

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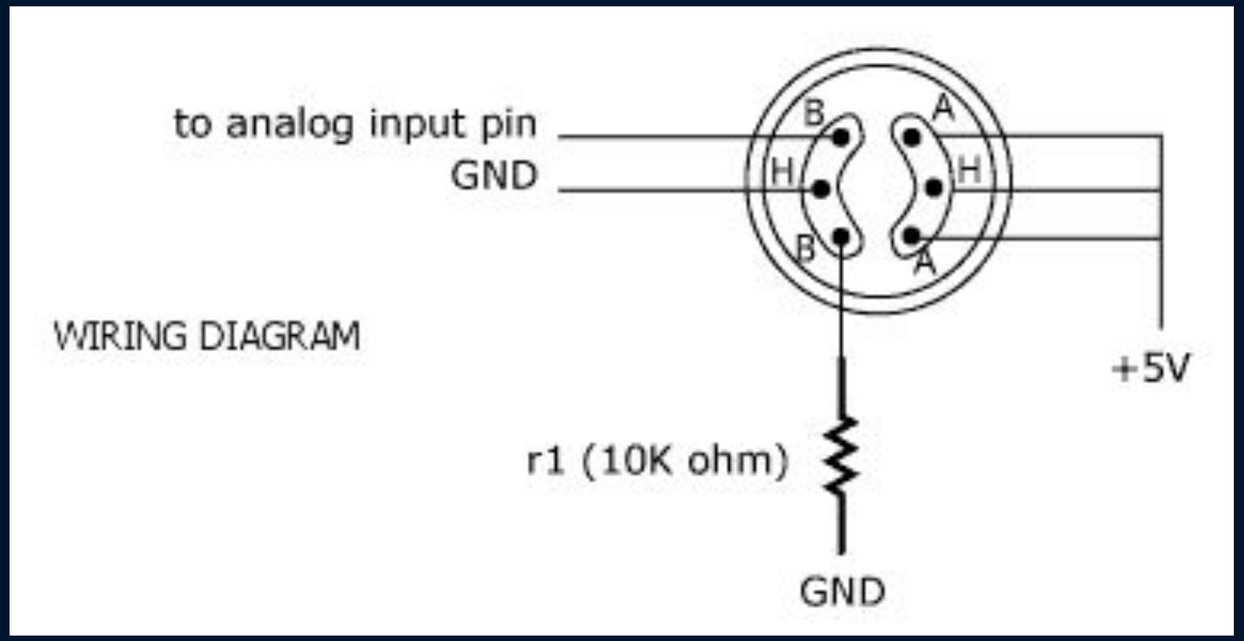
Gas Sensor



Piezo Buzzer

RGB LED

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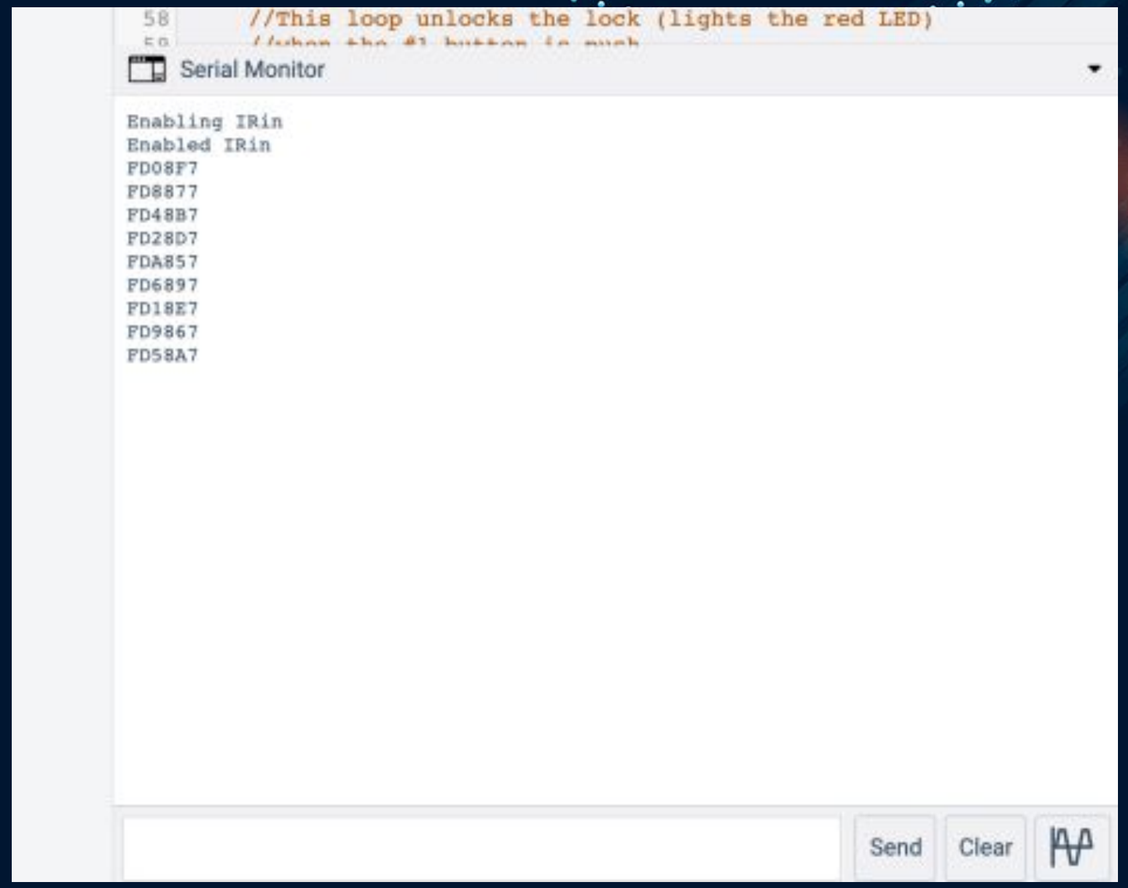
Serial Monitor

- The **serial monitor** is a 'tether' between the computer and your Arduino.
- It is an essential tool when creating projects with Arduino.
- It can be used as a debugging tool, testing out concepts or to communicate directly with the Arduino board.



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Project Link:
https://www.tinkercad.com/things/3d45fg0TqXi

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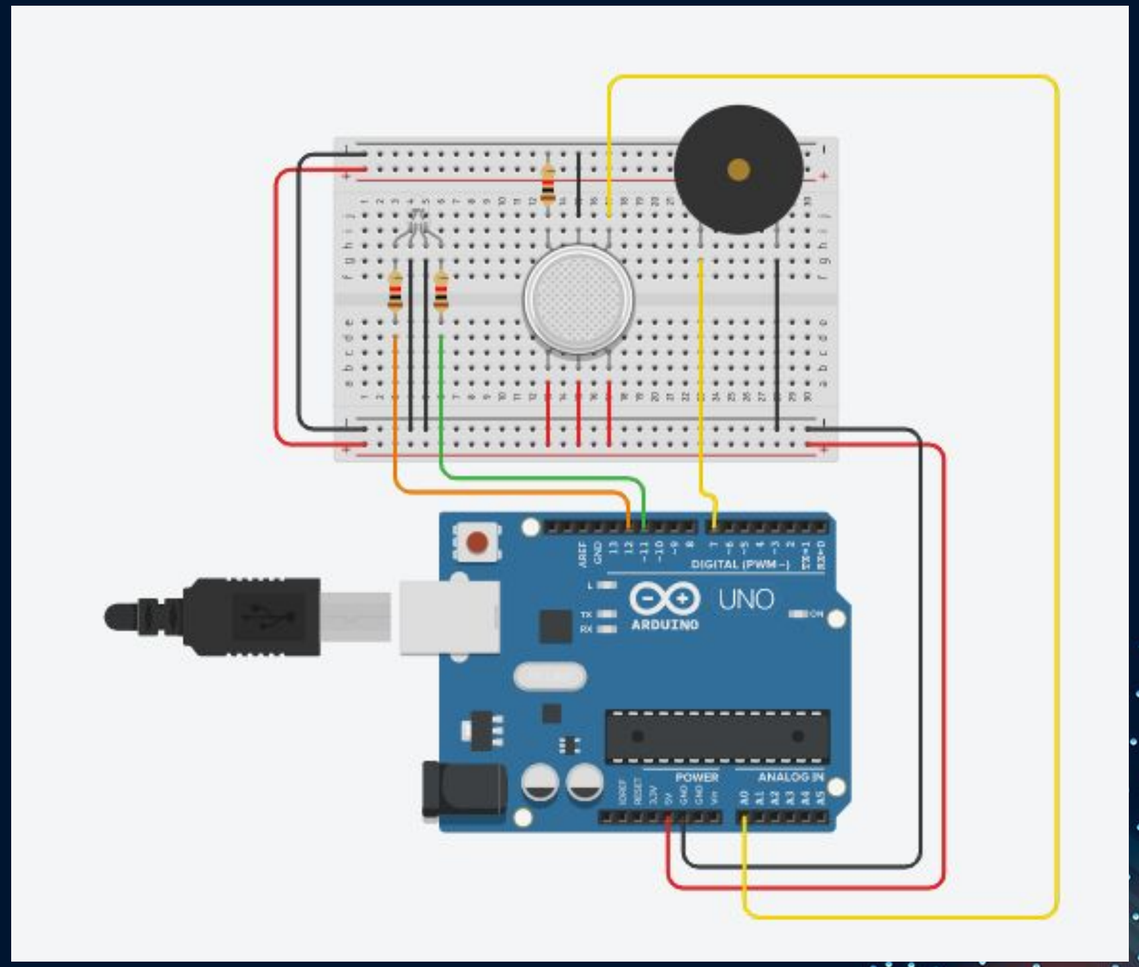

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Project-3
LCD Display

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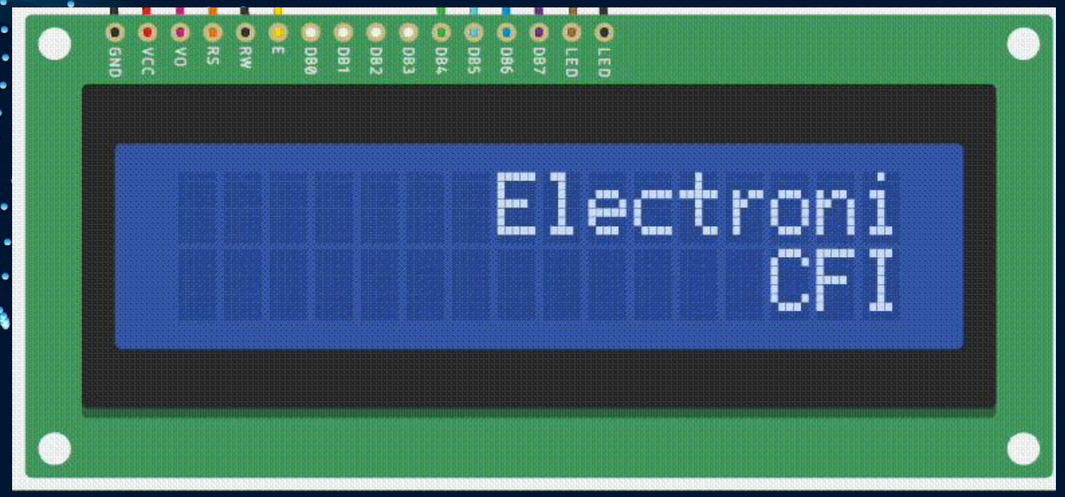

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General setup for the LCD display

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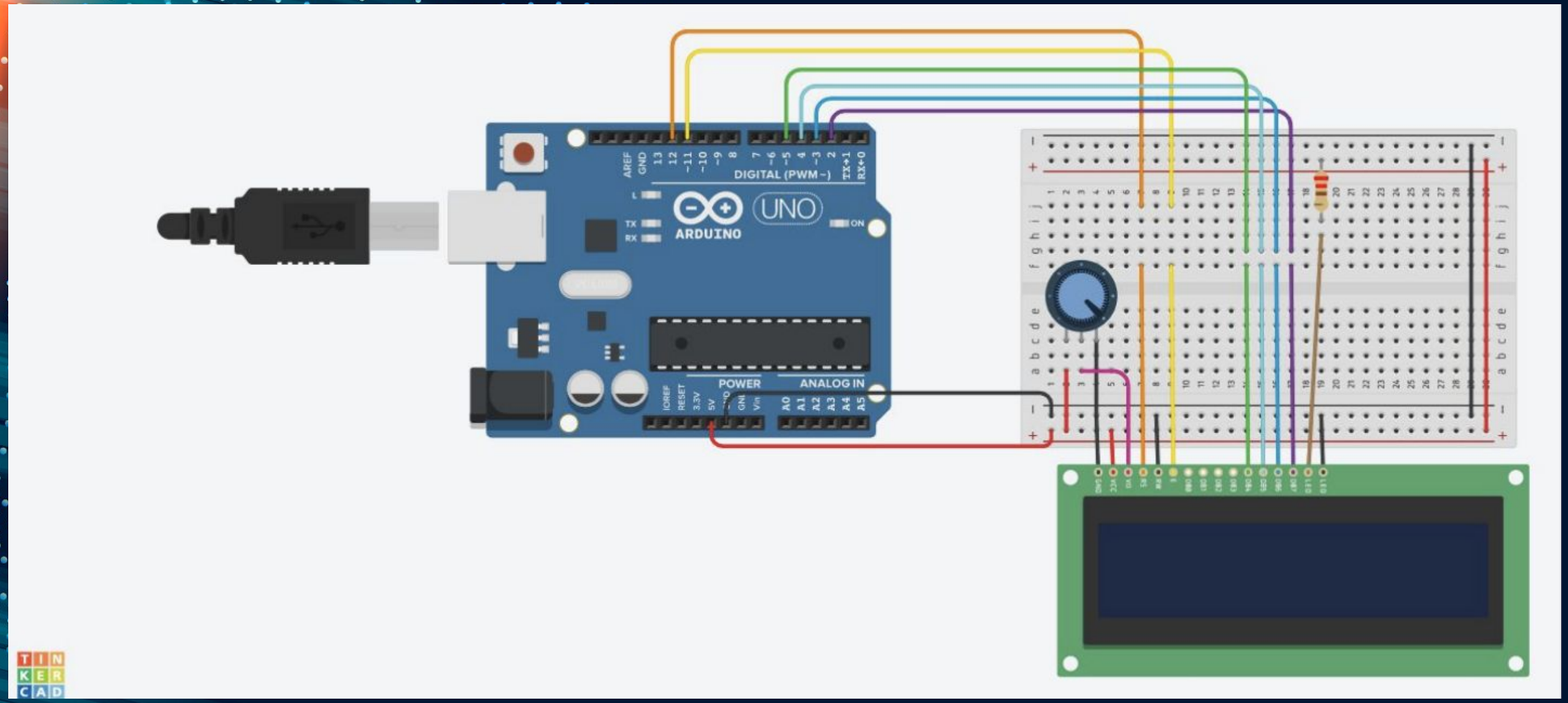

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```
// include the library code:
#include <LiquidCrystal.h>

// initialize the library with the numbers of the interface pins
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);

void setup() {
  // set up the LCD's number of columns and rows:
  lcd.begin(16, 2);
  // Print a message to the LCD.
  lcd.print("Electronics Club");
  lcd.setCursor(0,1);
  lcd.print("      CFI");
}

void loop() {
  lcd.setCursor(0, 1);
  // print the number of seconds since reset:
  for (int positionCounter = 0; positionCounter < 24; positionCounter++) {
    // scroll one position left:
    lcd.scrollDisplayLeft();
    // wait a bit:
    delay(100);
  }
}
```

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THANK YOU !

ANEESH KANDI
EE20B009
Coordinator

NIKHIL ANAND
BE20B022
Coordinator

ARUN PALANIAPPAN
ME20B036
Coordinator

PRAMAT SHASTRI JOIS
AE20B107
Coordinator

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Quiz Time !

Test yourself on your knowledge of Arduino!

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Quiz on Kahoot platform

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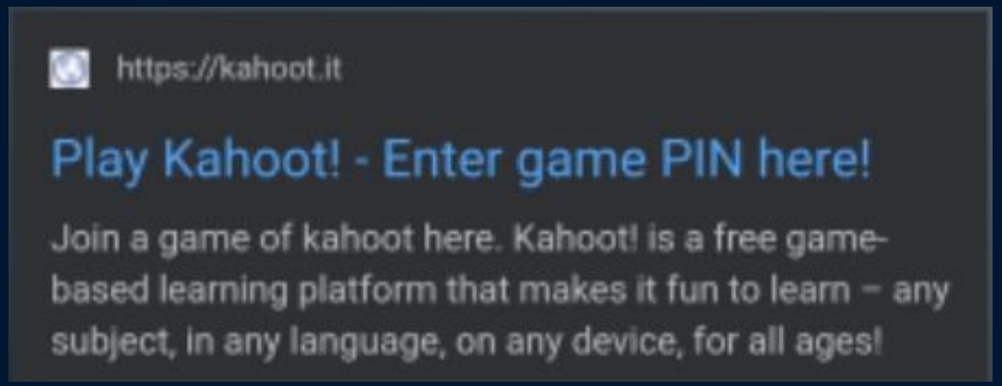
1) Search for ‘Kahoot’ on Google/any search engine

2) Click this



3) Enter the game pin that we display on the screen now