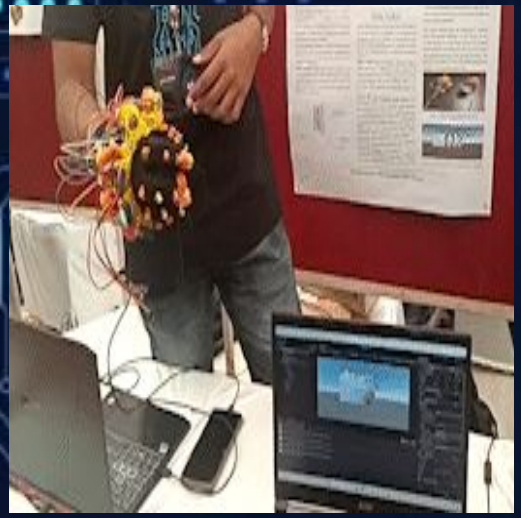
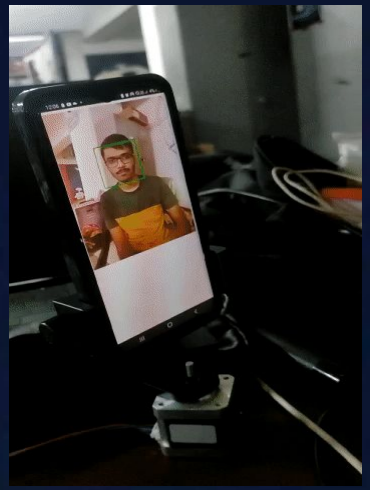
Portal to the Electronic Realm

What we do?

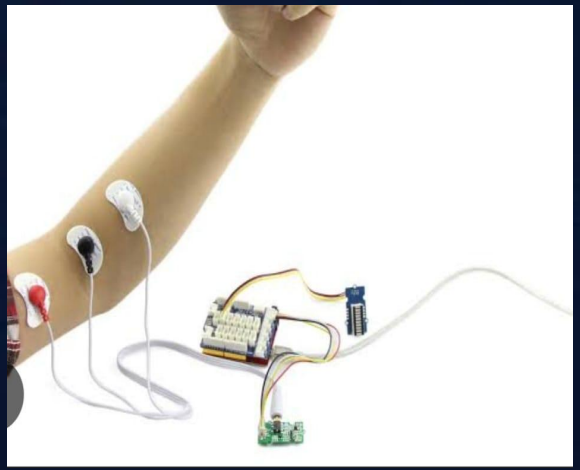
We are a group of *tech enthusiasts* who come together to form *cross-functional* teams where we *learn* from each other, have fun, and *develop our knowledge* in various domains of Electronics.

We work on a wide range of domains including *Internet of things, Robotics, Machine Learning, Digital design, Game Dev, Web Dev and a lot more.*

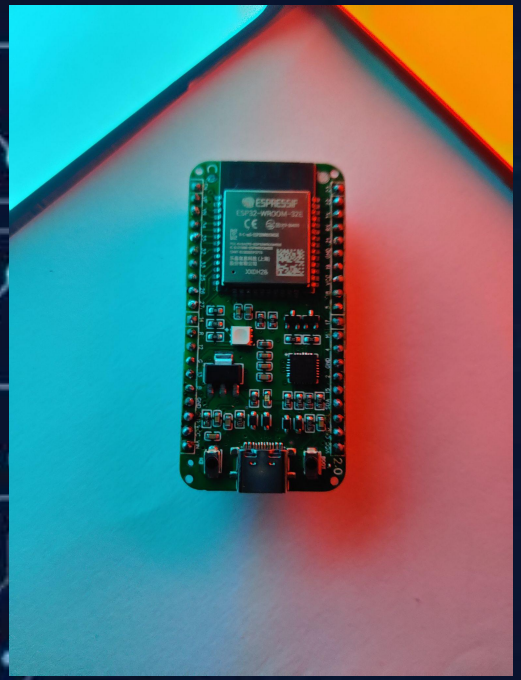


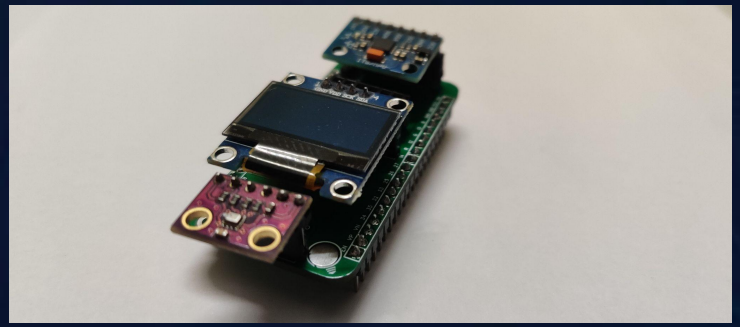


Projects we are currently working on



Our Flagship Event: Mega Session





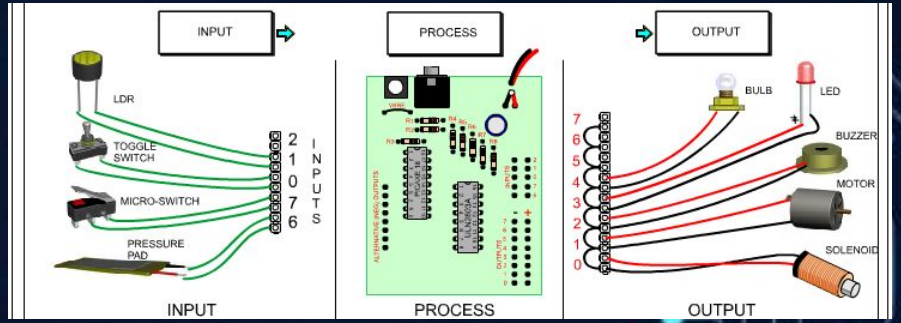
Mega Session 2.0

The Elec Club Team!

Microcontrollers

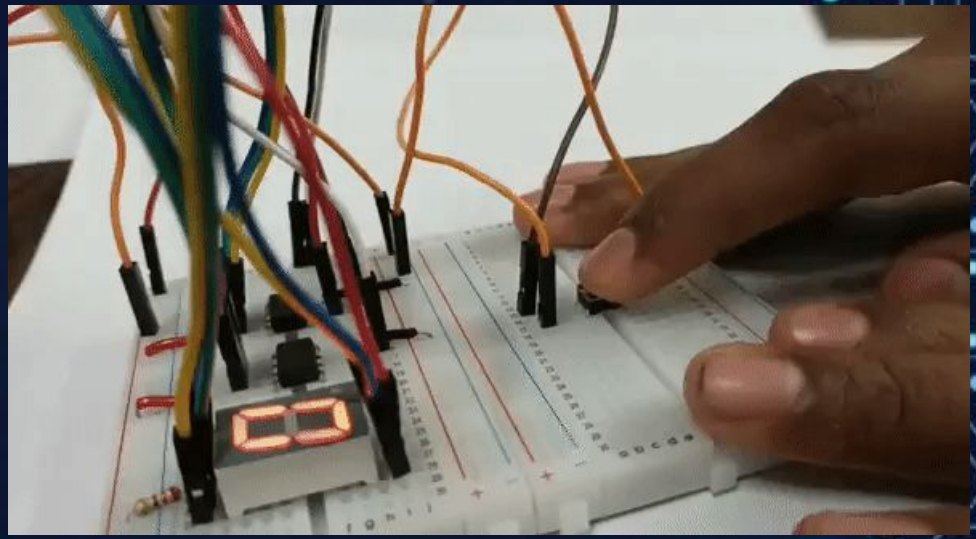
- A microcontroller is a small and low-cost microcomputer, which is designed to perform the specific tasks of embedded systems, Also referred to as, an embedded controller or microcontroller unit (MCU)

- They are found in vehicles, robots, office machines, medical devices, mobile radio transceivers, vending machines, home appliances etc.



Different types of microcontrollers

- ATMEGA328P
- ARM Microcontroller.
- ATtiny85
- ESP32



A counter using ATtiny microcontroller

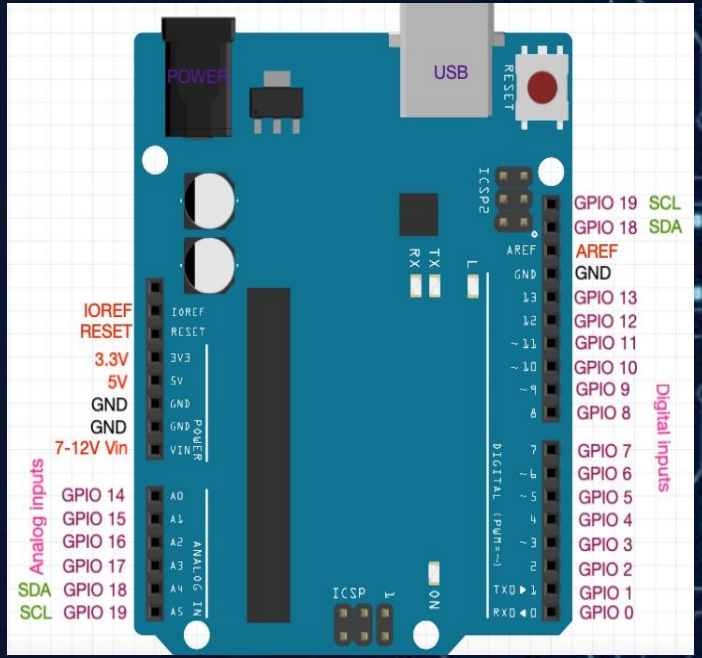
Parts of a Microcontroller

- Microprocessor
- Memory
  - RAM
  - ROM
- Oscillator/Internal Clock
- GPIO pins
- DAC and ADC

But, how do they work?

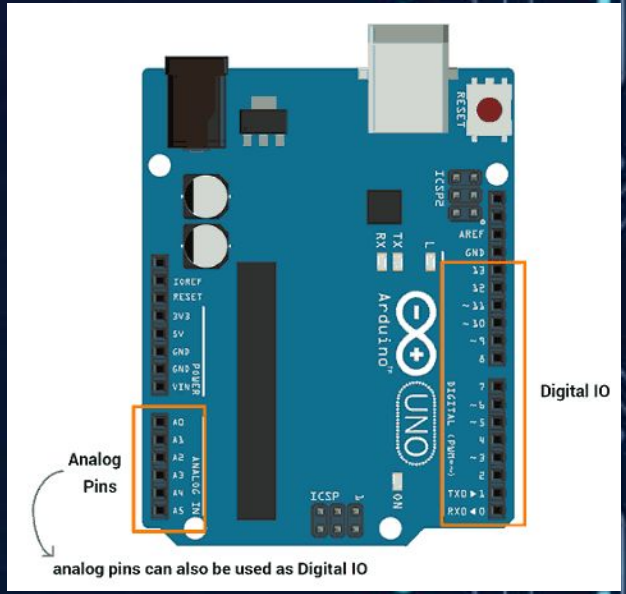
GPIO pins

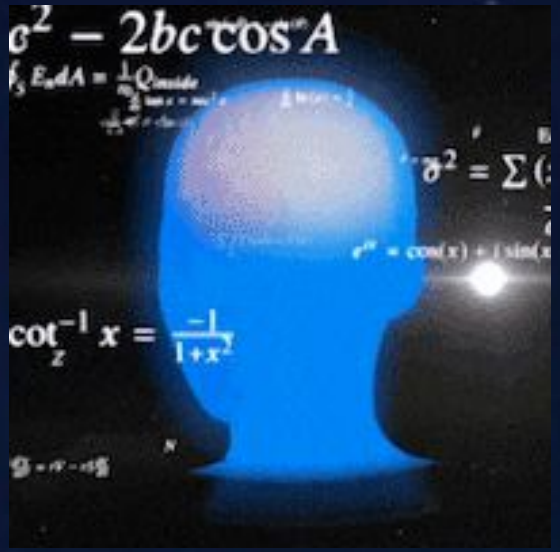
- Also known as General Purpose Input Output Pins, GPIO pins are a standard interface to connect microcontrollers with other electronic devices.
- These pins can either receive data from microcontrollers or send data to electronic devices to microcontrollers



Analog and Digital pin

Analog Pins	Digital Pins
Can output varying voltage from 0V to 5V	Can only output 0V or 5V
analogRead(); analogWrite();	digitalRead(); digitalWrite();
Can read Analog and Digital Signals	Can only read Digital Signals.



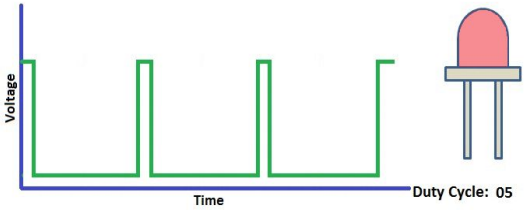


Meanwhile my brain processing why we have digital pins

PWM (Pulse Width Modulation)

PWM is used to send analog signals through a digital I/O pin.

This is achieved by sending pulses of power within a very short interval of time.

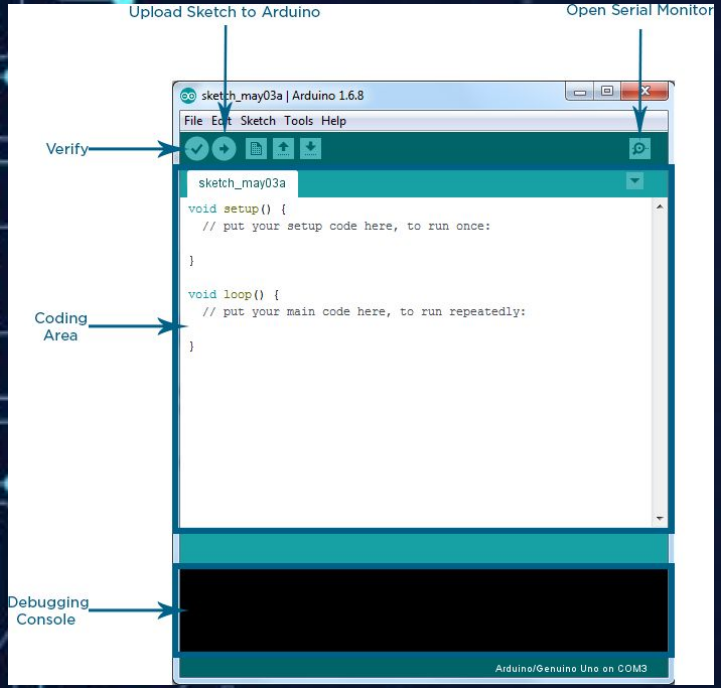


$$Duty\ Cycle = \frac{TON}{TON + TOFF}$$

$$Duty\ Cycle\ (\%) = \frac{TON}{TON + TOFF}\ X\ 100$$

Voltage output=Voltage supplied by the pin x Duty cycle

Arduino IDE

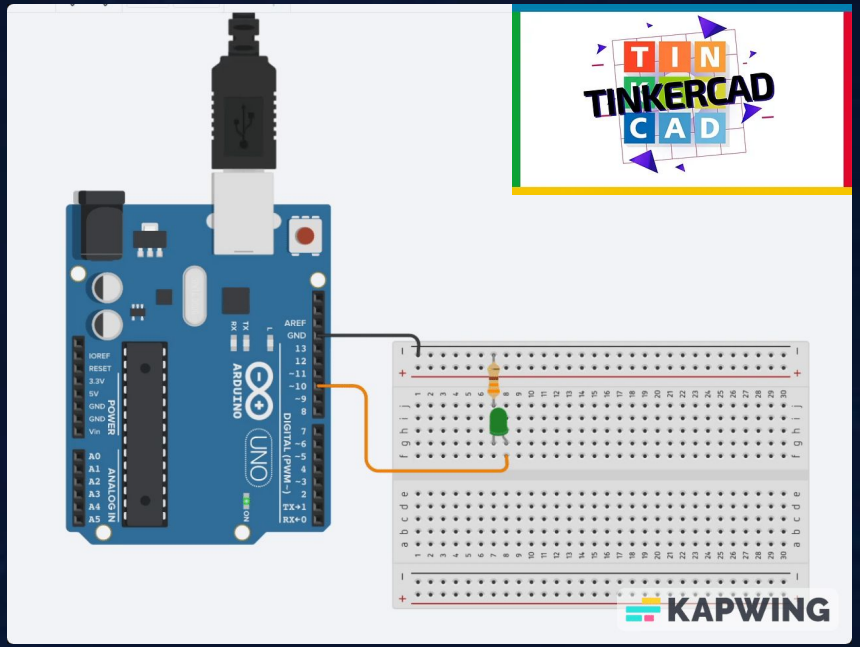


- Arduino IDE is an open source software used to write, verify, compile and upload code onto the microcontroller
- Not only limited to the Arduino boards. Arduino IDE also supports a variety of other microcontrollers such as ESP32, STM32, ATTiny.

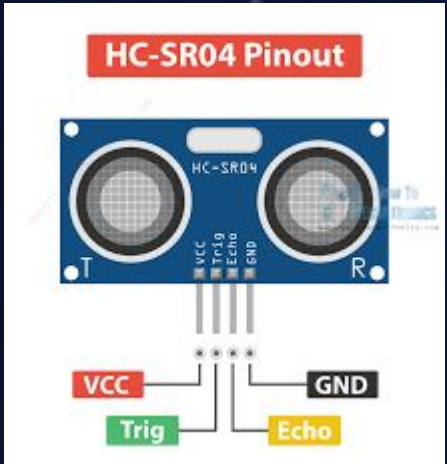
Internet Of Things (IOT)

- The Internet of things (IoT) describes electronic devices with sensors, processing ability, software and other technologies that connect and exchange data with other devices and systems over the Internet or other communications networks

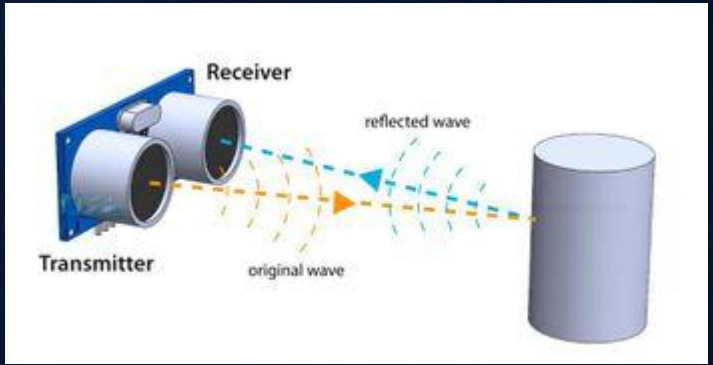
Bored of all this theory? How about we move onto the fun part! Let's go to Tinkercad and start tinkering!



UltraSonic Sensor

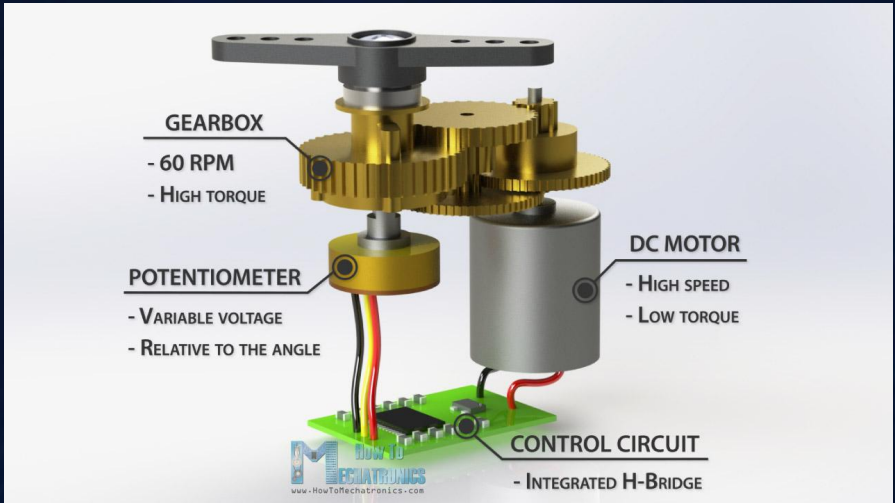


Ultrasonic Sensor is a sensor which sends and receives ultrasonic waves and uses the time interval between them to find the distance of the obstacle



Servo Motor

A servo motor is a motor that is used for high precision rotation. We can input the angle the motor should rotate.



WHAT NEXT