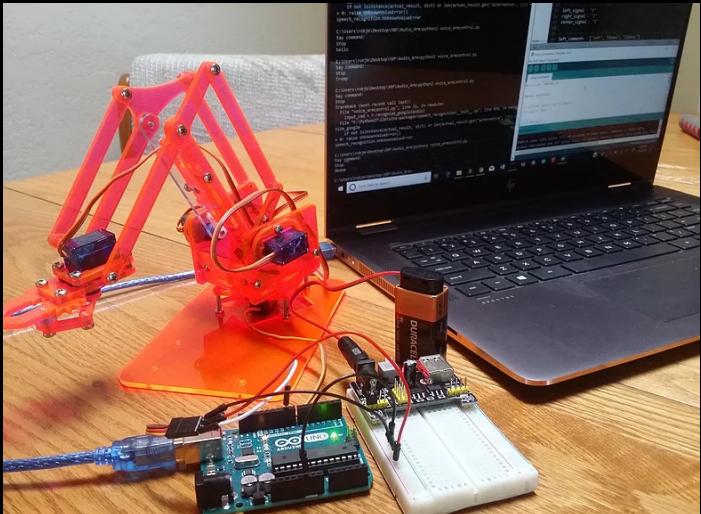


# Going Pro with Arduino!

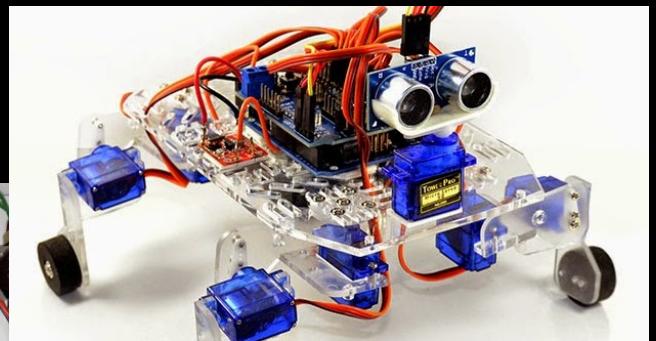
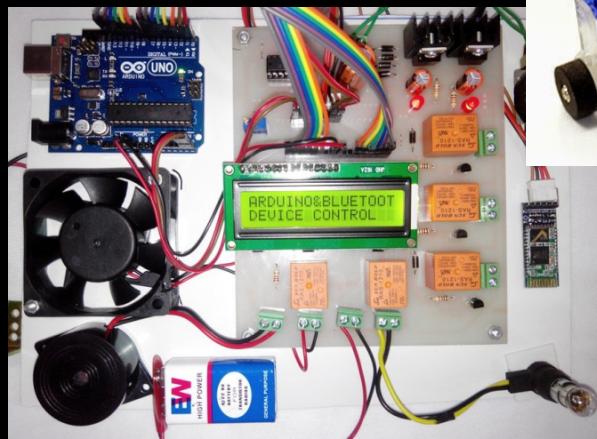
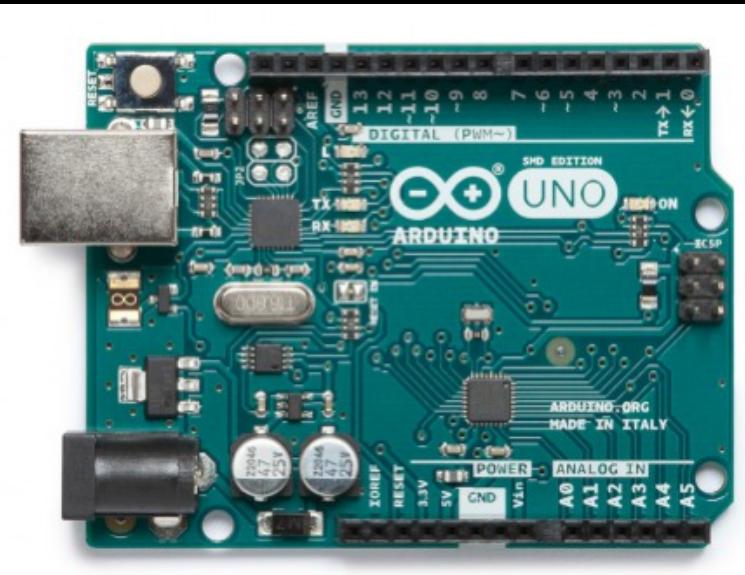
Robert Jomar Malate



# What is Arduino?

- Microcontroller
- Open source

- Great for making electronics projects



# Objectives

## Cover

- Setting up
- Basic Arduino components
- Simple projects
- Debugging common issues
- Laying foundation for projects

## Not Cover

- Electric engineering (beyond basic)
- Working with different types of Arduino boards
- Integration with external hardware (possible)

# Topics to Cover

1. Setting Up
2. Using the IDE
3. Basic electrical engineering
4. Basic Stuff (LEDs)
5. Input reading (Buttons, Pot, Ultrasonic sensor)
6. Outputs (Terminal, Servo)
7. Debugging Common Issues

# Materials

Arduino Uno (x1)	Breadboard (x1)
Wires (a lot) (x1)	Cable
LEDs (x1)	220
Resistor (x1)	
10k Resistor (x1)	Push-Button (x1)
10k Potentiometer (x1)	Ultrasonic sensor (x1)
90-degree servo (x1)	

# Setup

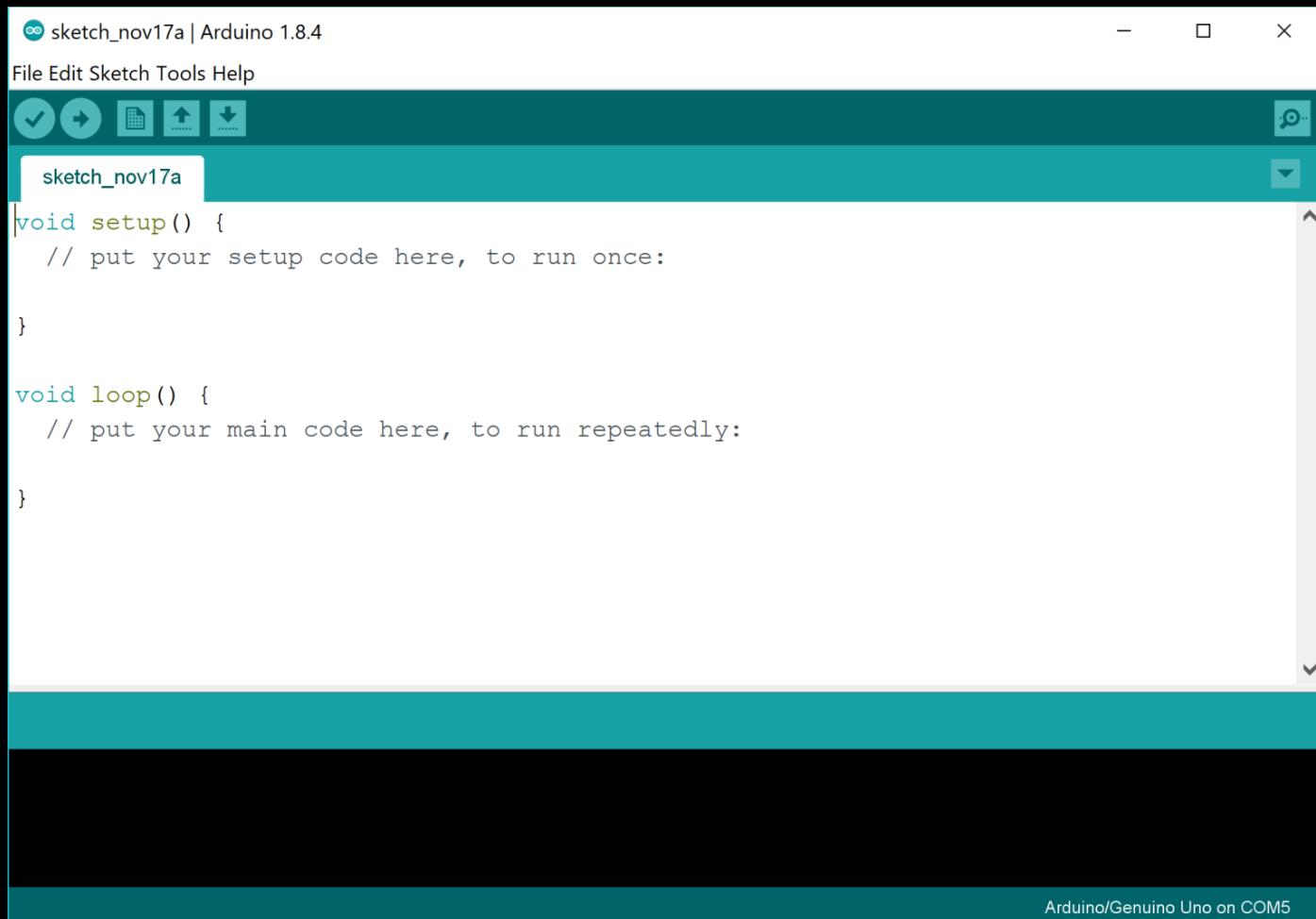
- Best run on computer

- Installing Arduino

<https://www.arduino.cc/en/Main/Software>

- Arduino Web Editor (Cloud Version)

# The IDE



# Basic Electrical Engineering

I. Flow from positive → negative → ground

II. Must flow to the same ground

III. Same wire, same rail, same flow

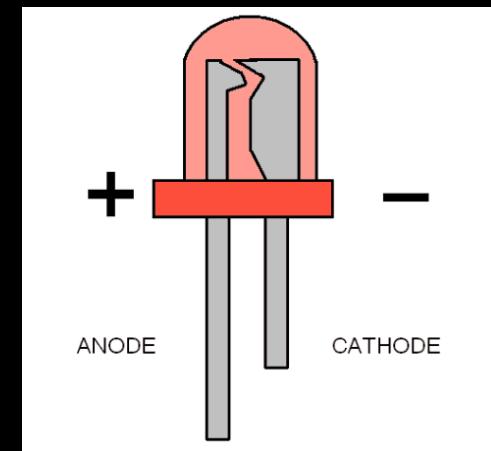
IV. Don't exceed the voltage

V. Ohm's Law:  $V = IR$



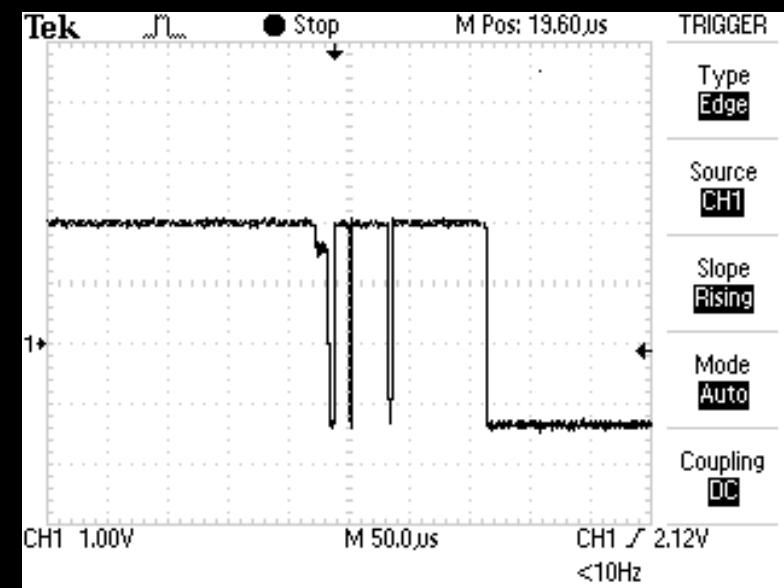
# LED

- `pinMode(pinNumber, OUTPUT);`
- `digitalWrite(pinNumber, HIGH/LOW);`



# Button

- `digitalRead(pinNumber)`
- boolean debounce (bool last)



# Potentiometer (Pot)

- `analogRead(pinNumber);`
- `map(input, minInputVal, maxInputVal,  
minOutputVal, maxOutputVal)`
- `Serial.begin(baudRate);`
- `Serial.print(string);`



# Ultrasonic Sensor

- `pulseIn(echoPin, HIGH)`



# Servo

- `#include <Servo.h>`
- `Servo myServo;`
- `myServo.attach(pinNumber);`
- `myServo.write(angle);`
- `myServo.read();`



# Debugging Common Issues

I. Circuit not wired properly

A. Positive → Negative → Ground

II. Drawing too much current

A. Add a new power source

III. Wrong board selected

IV. Port not selected (uploading code)

# Resources

- *Exploring Arduino* by Jeremy Blum
- Fritzing (documenting schematics)
  - <http://fritzing.org/home/>
- Arduino Project Ideas
  - <https://www.robjmal.com/arduino-ideas>

