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# Arduino Programming

# Hello!

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# 1.
# What is Arduino?

Let’s talk about Arduino…

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

# 2.
# What is IoT?

Have you heard of the Internet of Things?

Everyday Things get connected

For Smarter Tomorrow

IOT in Agriculture

Embedded System

Smart Retail

Internet of Things

DIRECT WiFi

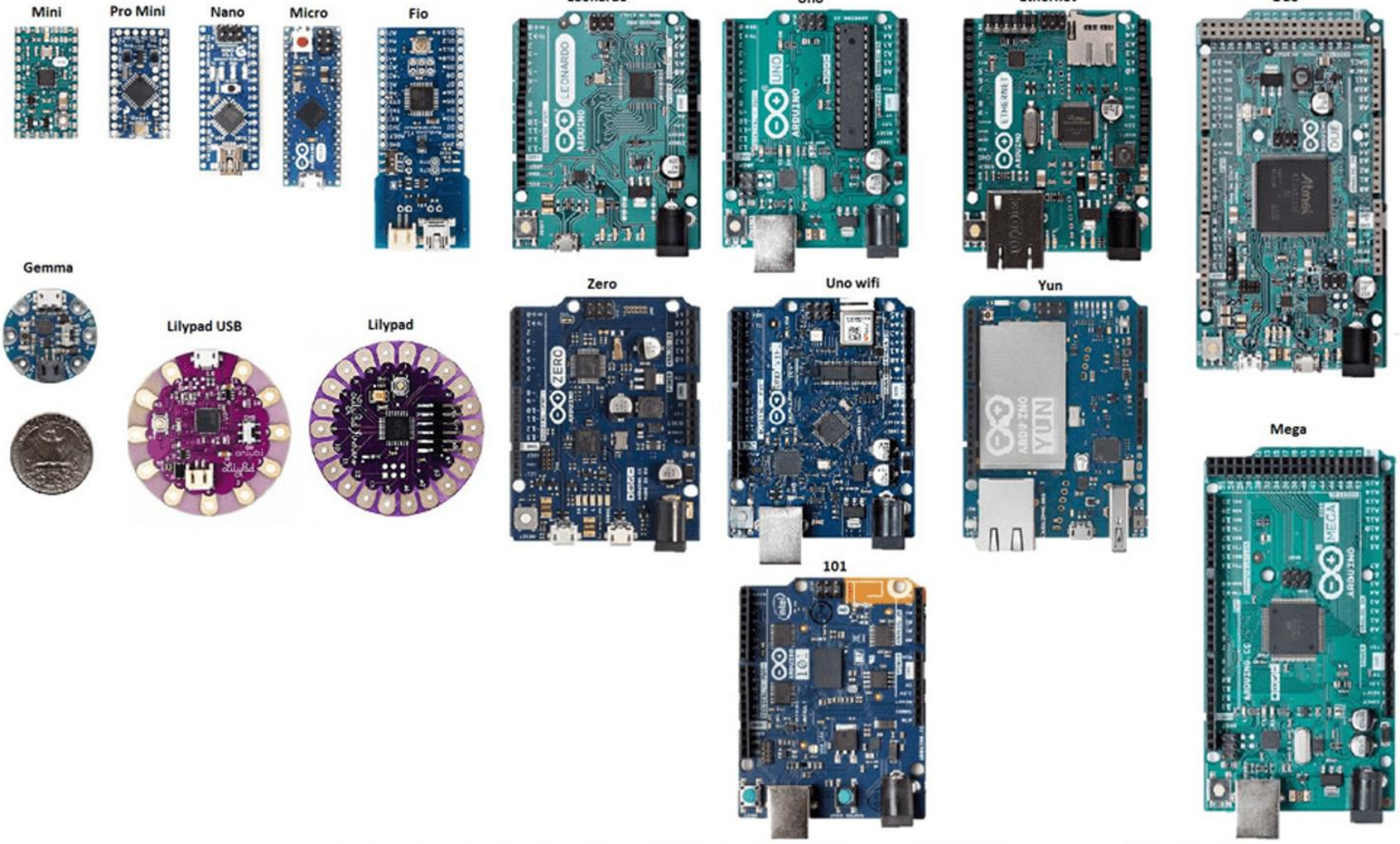
Wireless Connection

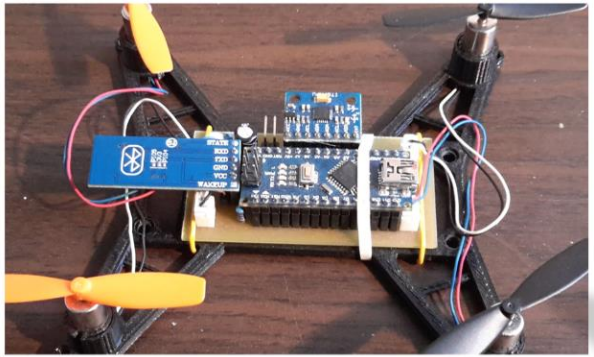
Smart Homes & Cities

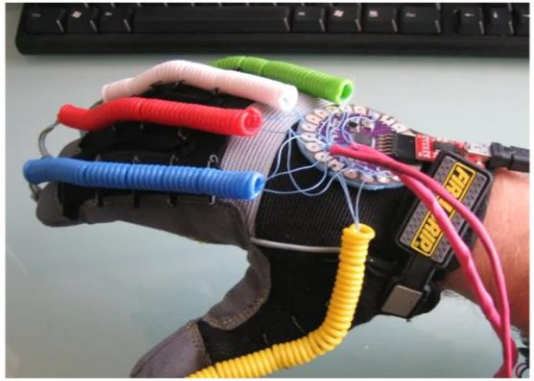
Vehicle ,Asset , Pet Monitoring & Controlling

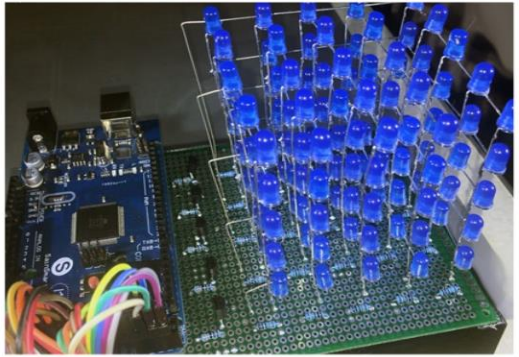
# 3. Arduino Boards

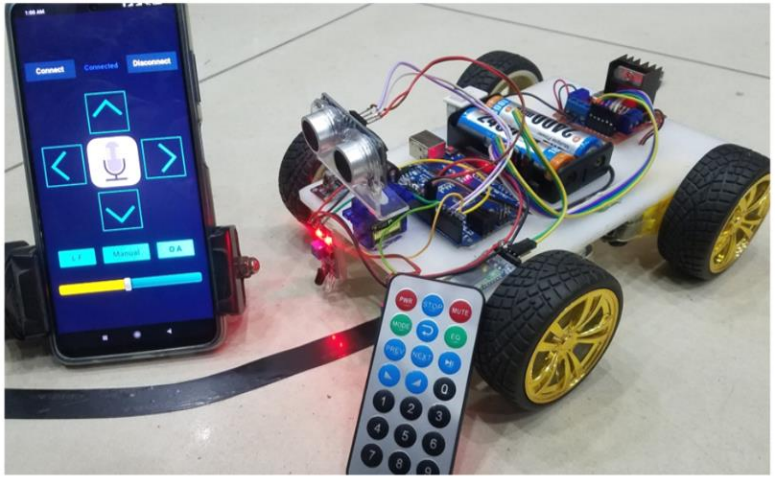
Let’s see different types of Arduino boards…


Mini
Pro Mini
Nano
Micro
Fio
Leonardo
Uno
Ethernet
Due
Gemma
Lilypad USB
Lilypad
Zero
Uno wifi
Yun
101
Mega








Connect
Connected
Disconnect


1 2 3 A
4 5 6 B
7 8 9 C
* 0 # D
1st NO= 59
Operator= +
2nd NO= 85
Result= 5015

# 4. Arduino UNO

Have you heard about the most popular Arduino board?

**Reset Button**
Resets the ATmega microcontroller

**Pin 13 LED**
The Arduino built-in LED

**Digital Pins**
Send and receive digital signals

**USB Port**
Used for powering Arduino, uploading sketches to Arduino, and for communicating with Arduino sketch

**Power LED**
This indicates that Arduino is receiving power

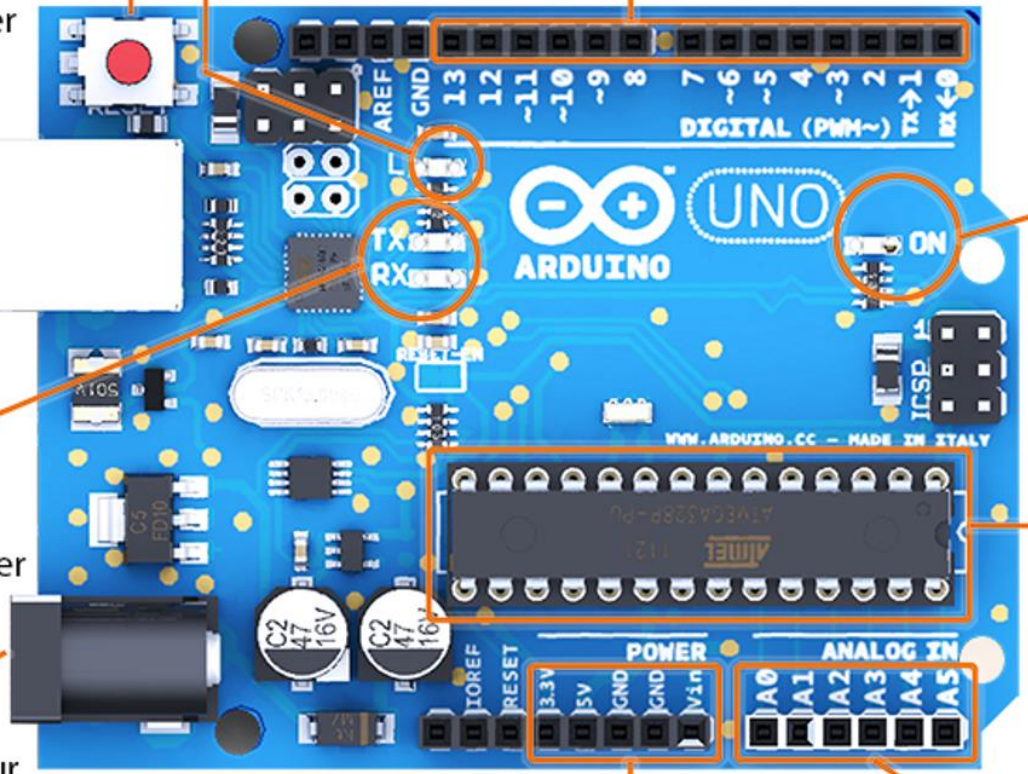
**TX and RX LEDs**
The following LEDs show that Arduino and computer are in communication

**ATmega microcontroller**
The heart and brain of Arduino Uno

**Power connector**
This is how you power your Arduino when it isn't plugged into a USB port for power. Acceptable voltages 7-12V dc.

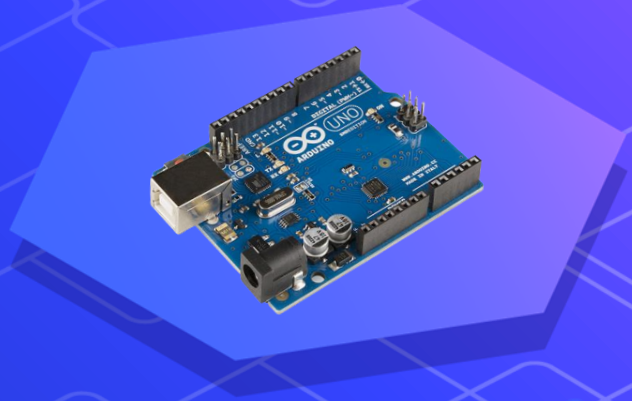
**Power Pins**
Distribute power to inputs and outputs

**Analog in**
To receive an analog value



# 5. Arduino IDE

Let’s have a look about the Arduino Integrated Development Environment.

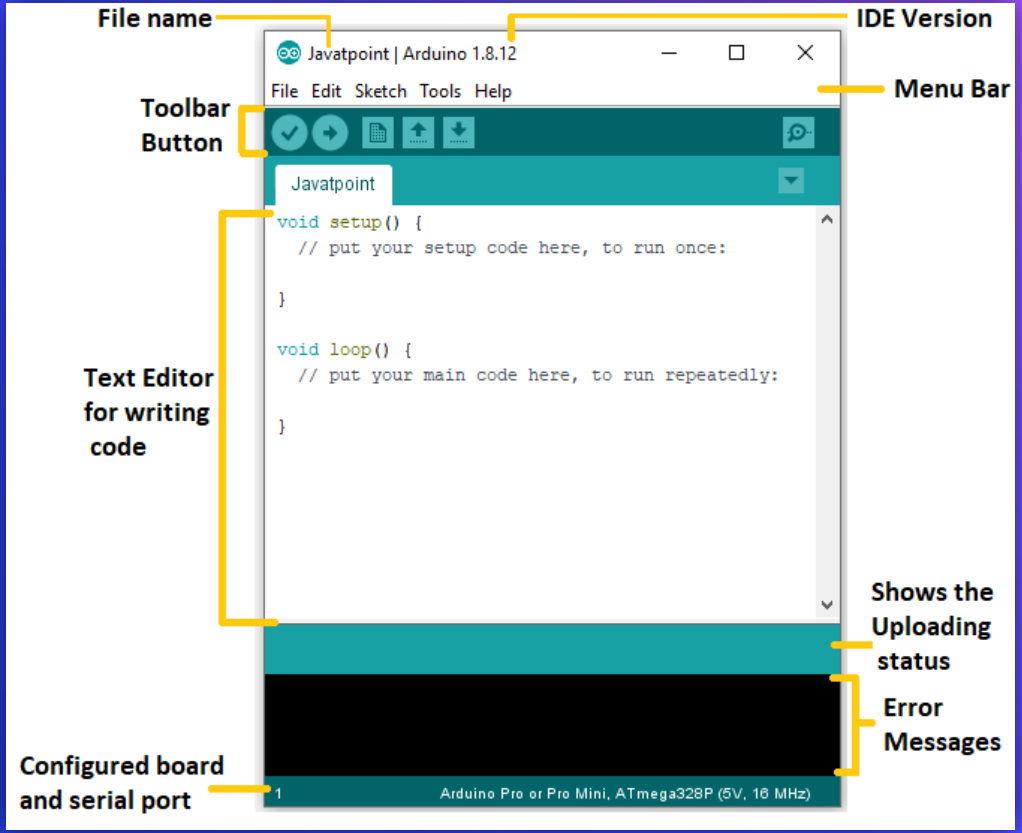


# Arduino IDE Installation

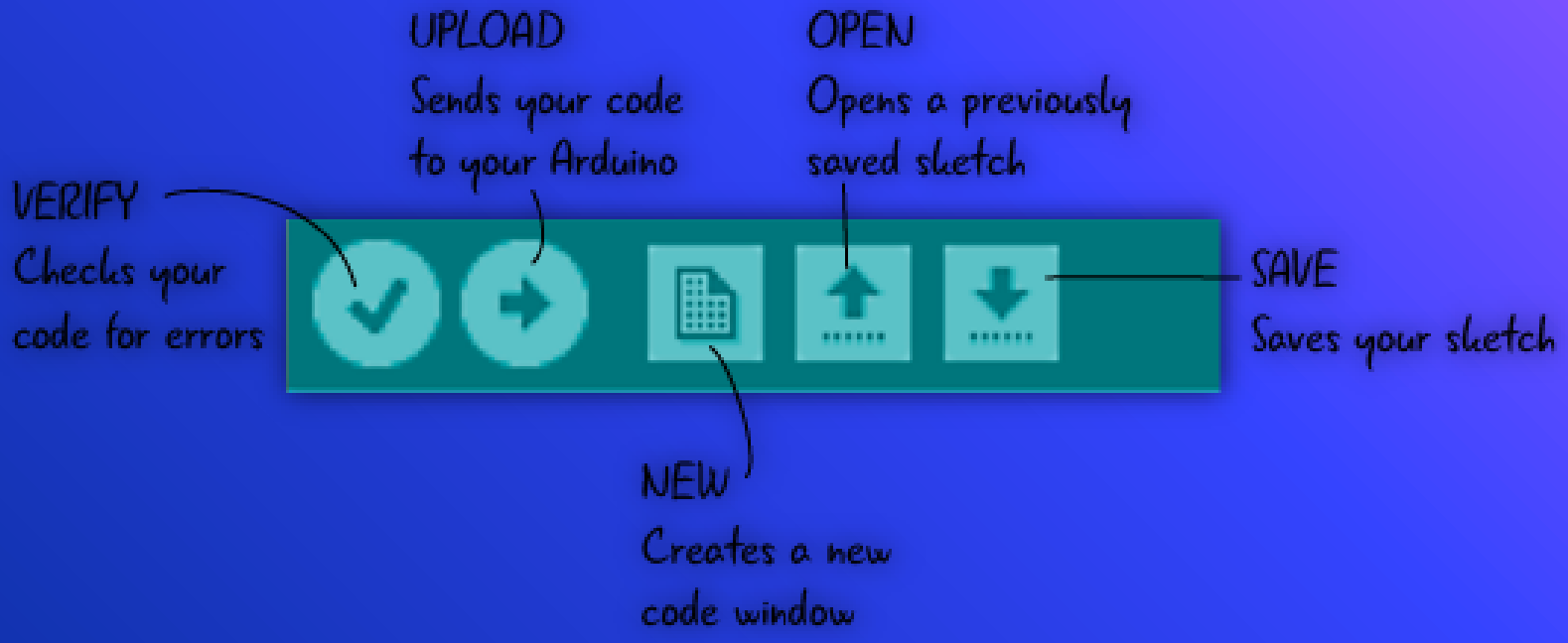
- Visit https://www.arduino.cc/en/software to download Arduino Legacy IDE version.
- Once you successfully install the Arduino IDE by running the setup file, launch the Arduino software by double clicking on the desktop shortcut.

# Arduino IDE

This is the place where you give commands to your Arduino board…



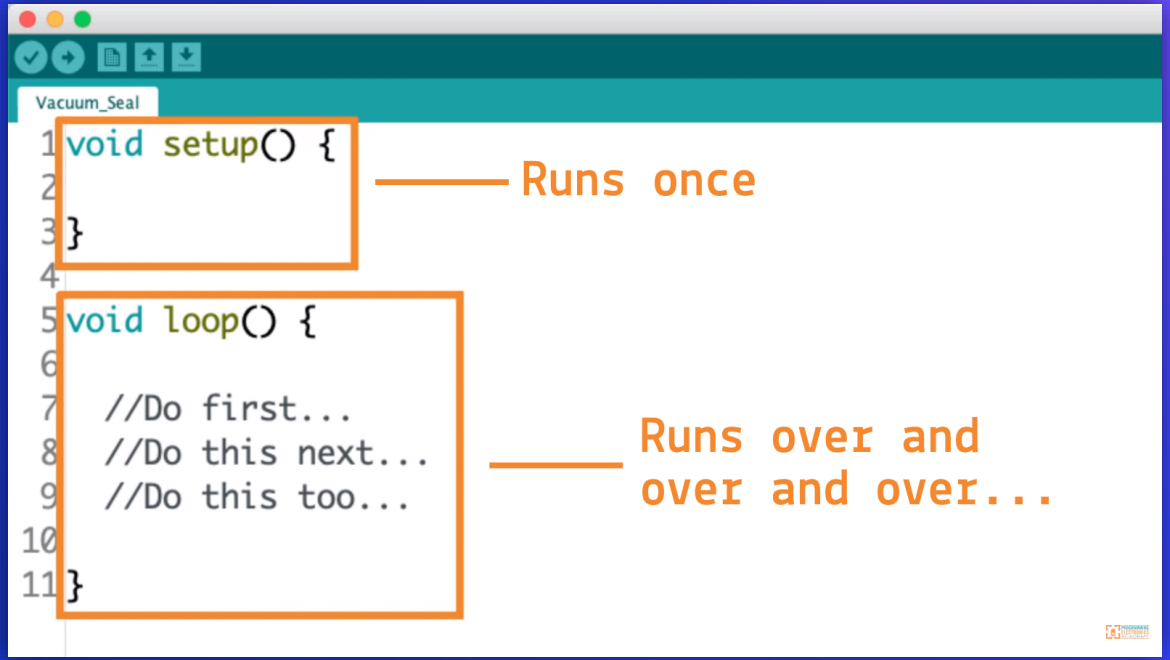
# Toolbar Buttons



# 6.
# setup() & loop() Functions

What are those default functions?

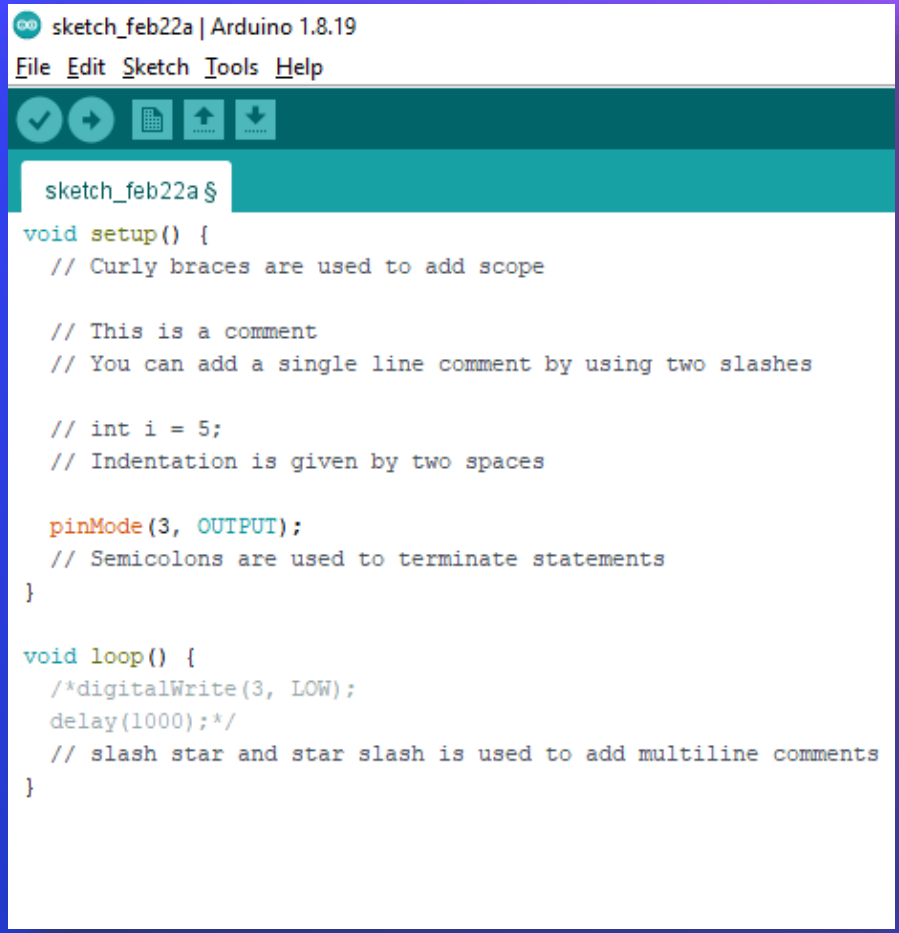
# void setup() & void loop()



# 7.
# Arduino Syntax & Program Flow

Let’s see Arduino programming language syntax and program flow…

- Curly Braces
- Semicolon
- Indentation
- Comments



# Configure Arduino Setup


**Board:**

Select your Arduino Board name from the available list.

**Port:**

Select the port that your Arduino is currently connected at.

# 7.
# Other Function

Let’s walk through some other important functions…

# pinMode() Function

| | |
|---|---|
| **Syntax** | pinMode(pin, mode) |
| **Parameters** | pin: the Arduino pin number to set the mode of.<br>mode: INPUT, OUTPUT, or INPUT_PULLUP. |
| **Example** | pinMode(5, OUTPUT);<br>pinMode(6, INPUT); |

# digitalWrite() Function

| | |
|---|---|
| **Syntax** | digitalWrite(pin, value) |
| **Parameters** | pin: the Arduino pin number.<br>value: HIGH or LOW. |
| **Example** | digitalWrite(13, HIGH);<br>digitalWrite(12, LOW); |

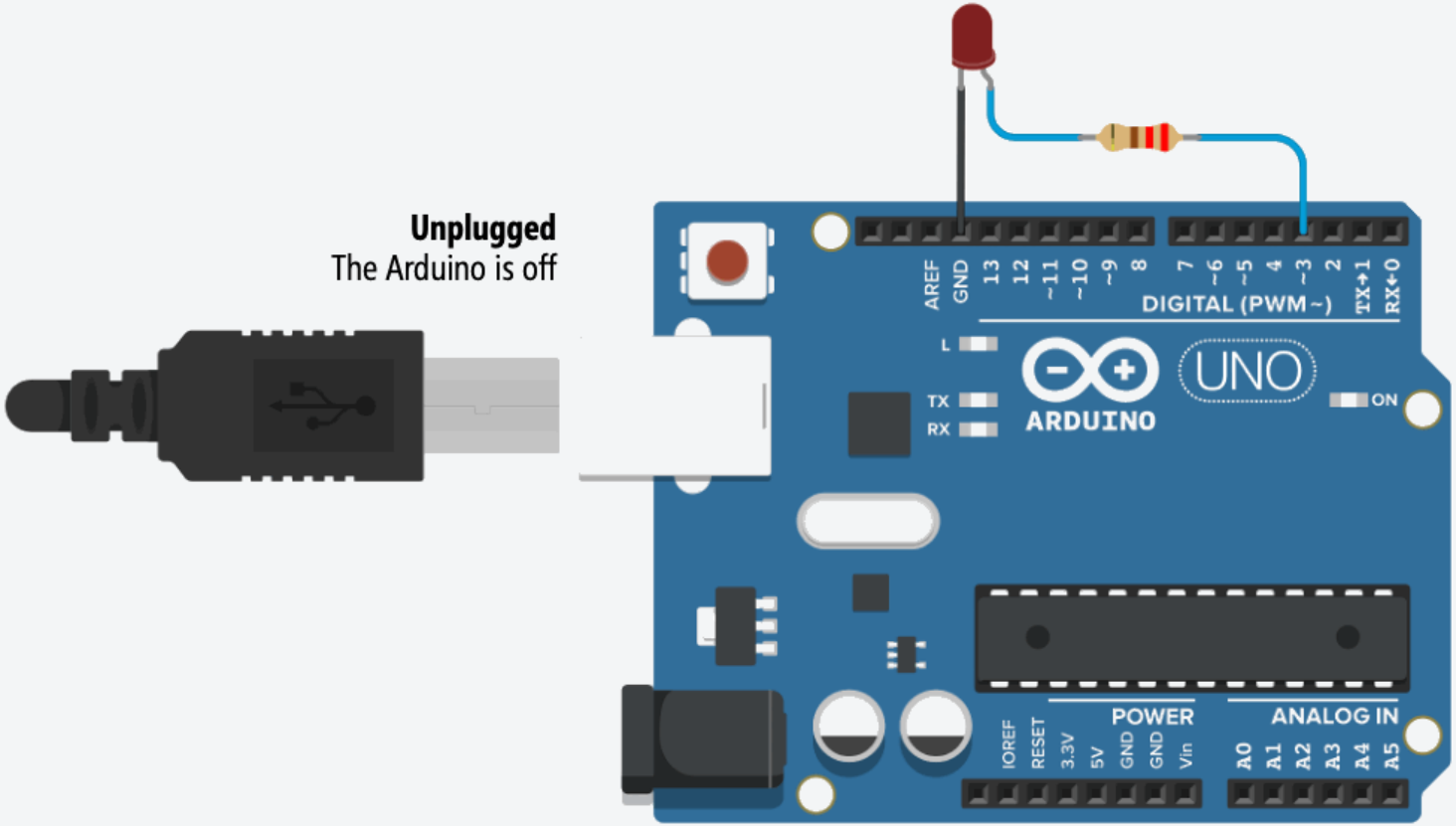
# delay() Function

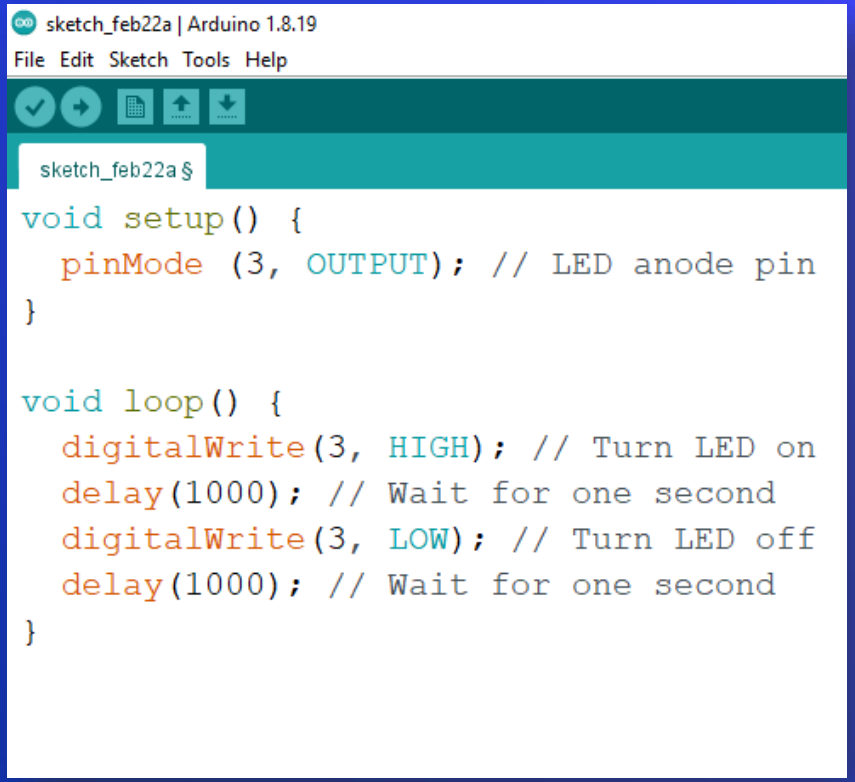
| | |
|---|---|
| **Syntax** | delay(ms) |
| **Parameters** | ms: the number of milliseconds to pause.<br>Allowed data types: unsigned long. |
| **Example** | delay(1000); // waits for a second<br>delay(1500); // waits for a second and a half |

# 8.
# Project 1
# Blink a LED

Let’s build our first simple project

**Unplugged**
The Arduino is off






# Pin Setup & Code

| | |
|---|---|
| **LED Anode** | Digital pin 3 |
| **LED Cathode** | GND |

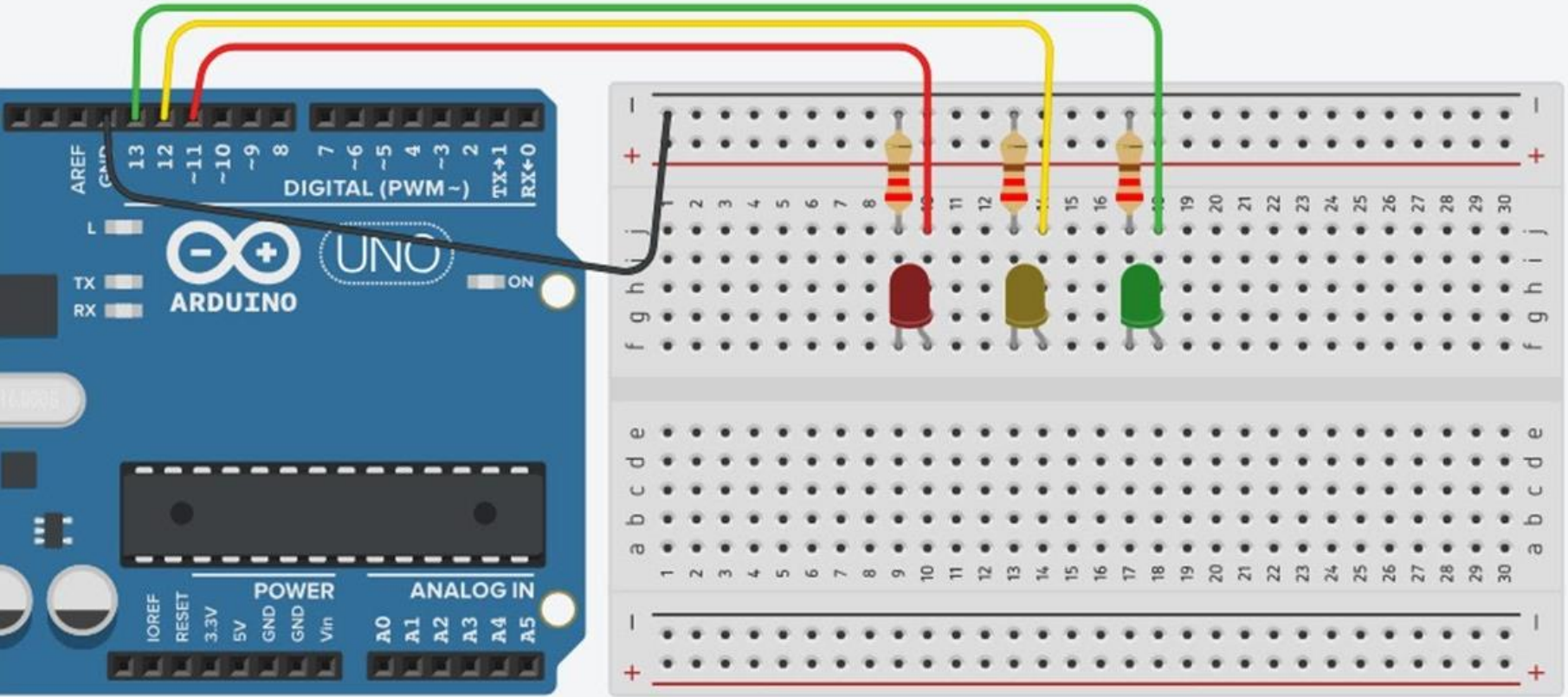
# Similar Codes

```
void setup() {
  pinMode(3, OUTPUT);
}

void loop() {
  digitalWrite(3, HIGH);
  delay(500);
  digitalWrite(3, LOW);
  delay(100);
}
```

```
void setup() {
  pinMode(3, OUTPUT);
}

void loop() {
  digitalWrite(3, HIGH);
  delay(500);
  digitalWrite(3, LOW);
  delay(100);
  digitalWrite(3, HIGH);
  delay(1000);
  digitalWrite(3, LOW);
  delay(100);
}
```

# 9.
# Project 2
# Blink 3 LEDs

Let’s blink two more LEDs…


AREF
GND
13
12
~11
~10
~9
8
7
~6
~5
4
~3
2
TX→1
RX←0
DIGITAL (PWM~)
UNO
ARDUINO
TX
RX
ON
POWER
ANALOG IN
IOREF
RESET
3.3V
5V
GND
GND
Vin
A0
A1
A2
A3
A4
A5


# Pin Setup & Code

| | |
|---|---|
| 1st LED Anode | Digital pin 11 |
| 1st LED Cathode | GND |
| 2nd LED Anode | Digital pin 12 |
| 2nd LED Cathode | GND |
| 3rd LED Anode | Digital pin 13 |
| 3rd LED Cathode | GND |

# 10. Few Extra Functions

Would you like to learn more?

# Serial.begin() Function

| | |
|---|---|
| **Syntax** | Serial.begin(speed) |
| **Parameters** | speed: bits per second (Supported values are: 9600, 14400, 19200, 38400, 57600, 115200, 230400 bps.) |
| **Example** | Serial.begin(9600); |

# Serial.print() Function

| | |
|---|---|
| **Syntax** | Serial.print(val) |
| **Parameters** | val: the value to print. (Allowed data types: any data type.) |
| **Example** | Serial.print(“Hello World”);<br>Serial.print(“Hi ” + “there”); |

# Serial.println() Function

| | |
|---|---|
| **Syntax** | Serial.println(val) |
| **Parameters** | val: the value to print. (Allowed data types: any data type.) |
| **Example** | Serial.println(“Hello”);<br>Serial.println(“World”);<br>Serial.println(“Programme”); |

# Thanks!

**Any Questions?**

Feel free to contact me at:

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Visit https://github.com/vishal-kalansooriya/arduinoProgramming to get the handout & other resources...