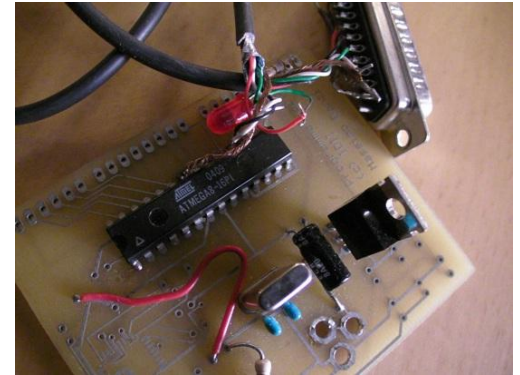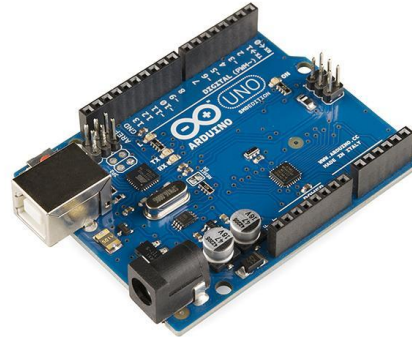# Introductory Arduino

Anton Njavro
17/04/2024

What, Why?

- Open-source electronics platform.
- Founded in the early 2000s by researchers at the Interaction Design Institute Ivrea (IDII) in Italy.
- "Arduino" derived from a bar in Ivrea, where founders often met.

- Gained traction due to simplicity, versatility, and affordability.

Features and Components

- Microcontroller, serves as the brain of the Arduino board, executing the code and controlling its behavior.
- Arduino boards come with a variety of input and output pins.
- These pins allow you to connect sensors, LEDs, motors, and other electronic components to the board.
- Arduino boards can be powered in multiple ways, including via USB, batteries, or an external power supply.
- Arduino provides an integrated development environment (IDE) for writing, compiling, and uploading code to the board.
- The IDE also includes a serial monitor for debugging and a library of pre-written code examples.

Our First Sketch!

- Every Arduino sketch consists of two main functions: setup() and loop().
- The setup() function runs once when the board is powered on or reset and is used for initialization tasks.
- The loop() function runs continuously after setup() and contains the main logic of your program.
- In the setup() function, we set the LED pin (LED_BUILTIN) as an output pin.
- In the loop() function, we repeatedly turn the LED on and off with a one-second delay between each state change.

```cpp
void setup() {
  // Initialize pin mode for LED
  pinMode(LED_BUILTIN, OUTPUT);
}

void loop() {
  // Turn on the LED
  digitalWrite(LED_BUILTIN, HIGH);
  delay(1000); // Wait for 1 second
  // Turn off the LED
  digitalWrite(LED_BUILTIN, LOW);
  delay(1000); // Wait for 1 second
}
```

Basic Concepts

- Analog Input
  - Analog pins can read analog voltage values between 0 and 5 volts.
  - They are used for analog input operations, such as reading sensor data.
- Digital Input
  - Digital pins can be in one of two states: HIGH (5 volts) or LOW (0 volts).
  - They are commonly used for digital input or output operations.
- pinMode() and digitalWrite() Functions:
  - pinMode():
    - The pinMode() function is used to configure a pin as either an input or an output.
    - Syntax: pinMode(pin, mode), where pin is the pin number and mode is INPUT or OUTPUT.
  - digitalWrite():
    - The digitalWrite() function sets the state of a digital pin to either HIGH or LOW.
    - Syntax: digitalWrite(pin, value), where pin is the pin number and value is HIGH or LOW.

Code Example

```
int sensorValue = 0;

void setup() {
    pinMode(A0, INPUT);
    Serial.begin(9600);
}

void loop() {
    sensorValue = analogRead(A0);
    Serial.print("Analog Value: ");
    Serial.println(sensorValue);
    delay(1000);
}
```

Exercise!

- Now that we know basics of Arduino

  programming, and how to read analog input. Let

  us connect [potentiometer](#) and read its input.

- After we have done this, let us add a [simple](#)

  [servo motor](#) and control it through

  potentiometer.