

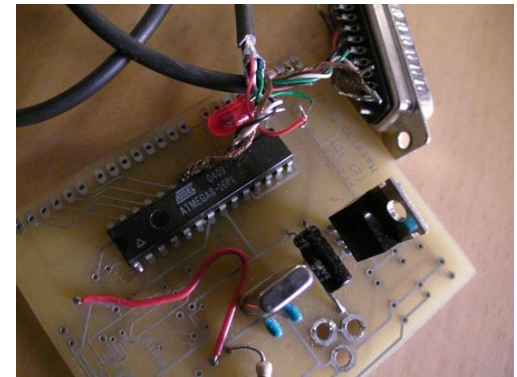
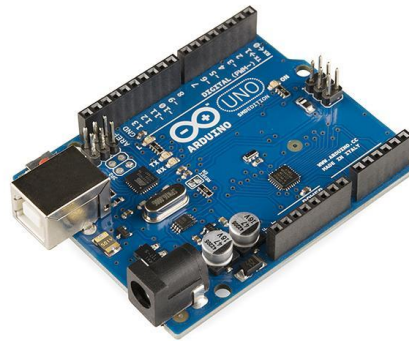


Introductory Arduino

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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.

```
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);
}
```