



Introduction to Arduino

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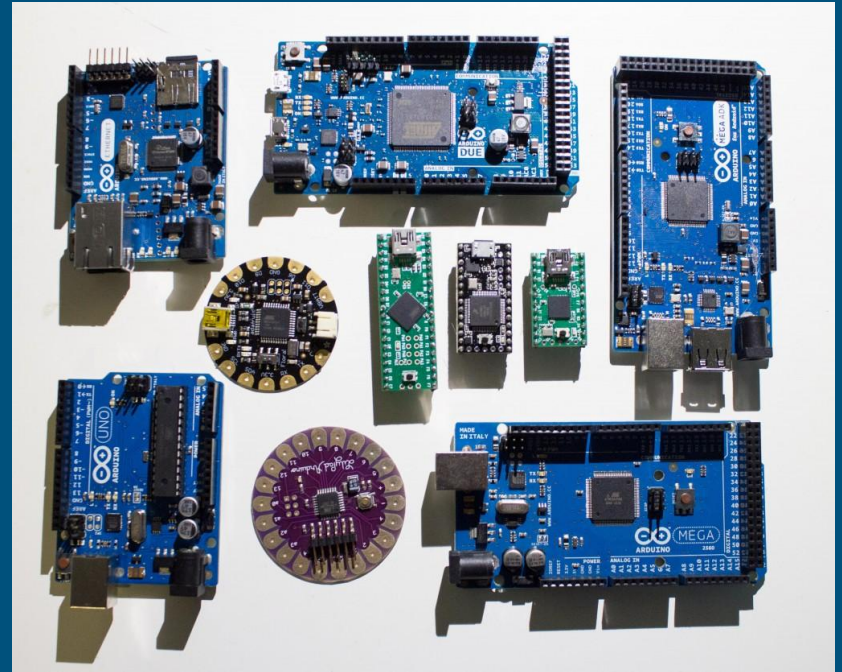
What is Arduino?

Arduino is an ecosystem for embedded development.

- Microcontroller development hardware
- Integrated Development Environment (IDE)
- Software framework
- Collection of software libraries

Arduino Hardware

- Open Source
- Basic break-out boards to fully featured development systems
 - \$2 to \$100's
 - Uno, Nano, Mega, Yún, etc.
- Arduino compatible (or mostly compatible) hardware from other vendors
 - STM32 (Blue/Black pill)
 - Teensy (Very powerful, has DSP!)



Arduino Shields

- “Standard” expansion format
- Official and third parts
- Options for pretty much anything you want to do
 - Relays
 - LEDs
 - Buttons and joysticks
 - Network connectivity
 - Displays



Integrated Development Environment (IDE)

- All-in-one editor, compiler, upload tool, board and library manager
- Download from arduino.cc
 - Local installable version and lightweight web IDE
- Available for most platforms (Windows, Mac, Linux)
- Open source
- Write “sketches”

A screenshot of the Arduino IDE interface. The window title is "Blink | Arduino 1.8.5". The main editor area shows the following code:

```
This example code is in the public domain.

http://www.arduino.cc/en/Tutorial/Blink
*/

// the setup function runs once when you press reset or power the board
void setup() {
  // initialize digital pin LED_BUILTIN as an output.
  pinMode(LED_BUILTIN, OUTPUT);
}

// the loop function runs over and over again forever
void loop() {
  digitalWrite(LED_BUILTIN, HIGH); // turn the LED on (HIGH is the voltage level)
  delay(1000); // wait for a second
  digitalWrite(LED_BUILTIN, LOW); // turn the LED off by making the voltage LOW
  delay(1000); // wait for a second
}
```

The status bar at the bottom indicates "32" on the left and "Arduino/Genuino Uno on COM1" on the right.

Demo:

Load, build, and upload a
sketch

Writing Arduino Sketches

- Based on C++ and Wiring/Processing
- Most code will be in `setup()` and `loop()`
- Lots of methods available for common tasks
 - <https://www.arduino.cc/reference/en/>
 - Analog and digital I/O
 - Serial port read/write
 - Math functions
 - USB

```
void setup() {  
    pinMode(LED_BUILTIN, OUTPUT);  
}  
  
void loop() {  
    digitalWrite(LED_BUILTIN, HIGH);  
  
    delay(1000);  
  
    digitalWrite(LED_BUILTIN, LOW);  
  
    delay(random(500, 1500));  
}
```