Learn Electronics & Programming with Arduino

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Summary:

The Arduino microcontroller is a small programmable board that can be used to control all sorts of circuits. In this mini-workshop we'll be learning how to make small circuits, connect them to an Arduino Uno, and program their behavior.

Resources & useful links

Materials for this class: `https://github.com/clarissalittler/intro-arduino-workshop`

Built-in tutorials in IDE: `File` → `Examples` → `Built-in Examples`

Built-in tutorials online: `https://www.arduino.cc/en/Tutorial/BuiltInExamples`

Arduino official tutorial list: `https://www.arduino.cc/en/Tutorial/HomePage`

TinkerCAD simulator: `https://www.tinkercad.com/#/?type=circuits`

Arduino IDE download: `https://www.arduino.cc/en/Main/Software`

Best C programing book: `https://en.wikipedia.org/wiki/The_C_Programming_Language`

Arduino projects on Instructables `http://www.instructables.com/id/Arduino-Projects/`

Arduino projects on official site `https://create.arduino.cc/projecthub`

Getting started at home

To get started working on your own projects at home you'll need to have, at the bare minimum, 1. An Arduino board 2. A serial cable to connect it 3. A computer with the Arduino IDE installed

You'll probably *also* want some kind of kit with electronics components if you don't have one already. There are a number of them for sale through Adafruit: `https://www.adafruit.com/category/17`

Glossary

Voltage The energy differential between two places in a circuit, measured in volts

Current How much charge is moving through the circuit per second, measured in Amperes

Ground A stable reference point for measuring voltage and a sink for current

PWM Pulse-width modulation: a technique for simulating analog output by rapidly turning on and off the digital pin

Digital pins Pins that are either `HIGH` or `LOW`. Can be used for both input and output.

Analog pins Pins that can be read to produce a range of values from 0 to 1023.

C Programming Language The underlying language for programming Arduino boards.

Resistor A material that *resists* electrical current, slowing it down like a narrow pipe.

Pot/Potentiometer Acts like a variable strength resistor

IDE Integrated Development Environment, a program that helps you write and run code

Breadboard A board that you can plug electronics components into temporarily to build circuits