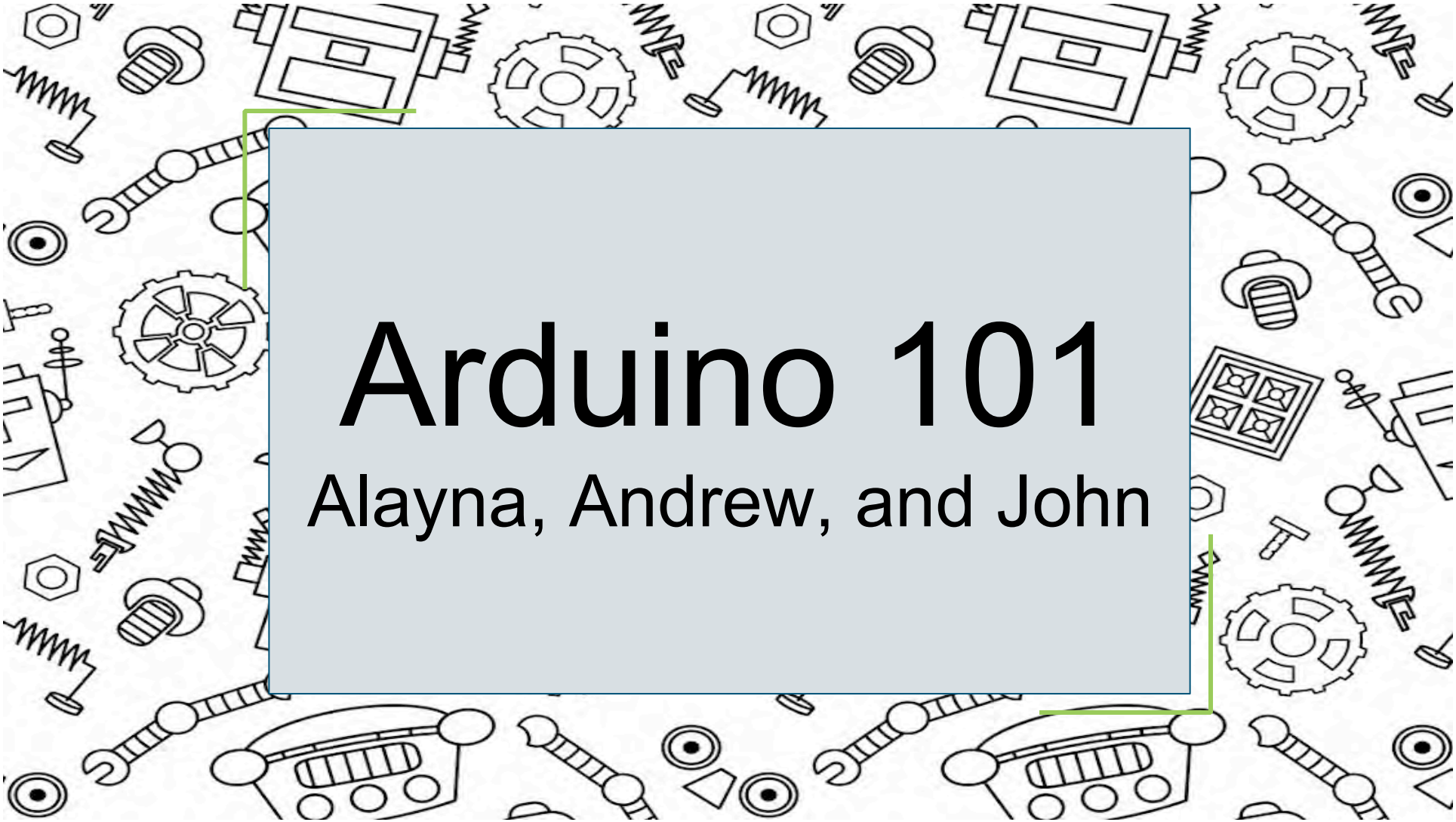
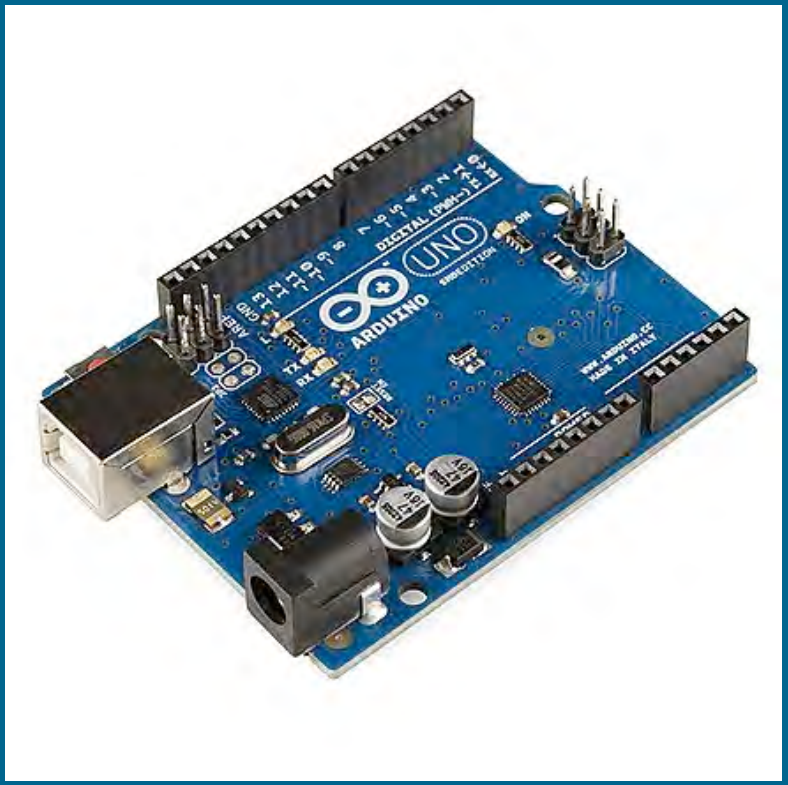

Arduino 101
Alayna, Andrew, and John

The basics

- Open source hardware and software company
- Single-board microcontroller kit for sensing and manipulating objects
- Usually programmed in C or C++ but any language that compiles into binary machine code may be used
- Named after a bar in Ivrea, Italy



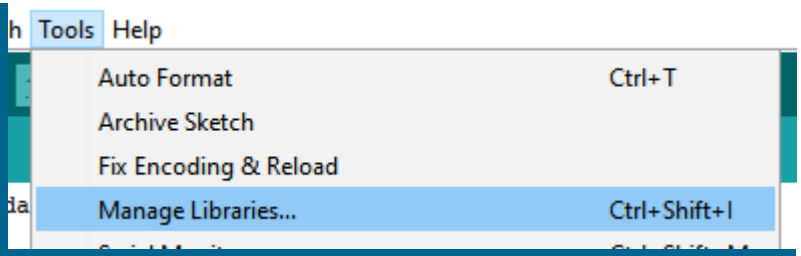
Hardware

- “Microcontroller”
- Unlike many circuit boards, Arduino does not need separate hardware to load code; uses USB instead
- Basic components
  - USB jack
  - Pins to connect to breadboard
    - Ground
    - 5V, 3.3V
    - Analog
    - Digital
    - Pulse-width modulation (PWM)
    - Analog reference (AREFF)
  - Reset button
  - LED power indicator
  - Transmit/receive LEDs (TX RX)
  - Integrated circuit (IC)
  - Voltage regulator

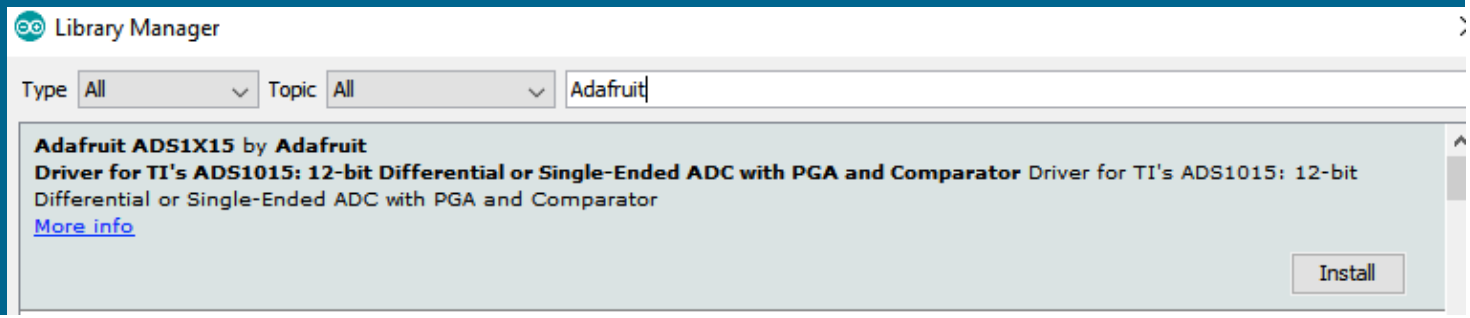
Software

- IDE written in Java. Includes:
  - Text editing
  - Single mechanism to compile and upload programs
  - Message area
- Sketch: where programs live
  - .ino file
  - Basic programs consist of only two features:
    - setup(): called upon power-up or reset; initializes variables, creates input and output pin modes
    - loop(): executes repeatedly after setup() ends until the board is powered off or reset
    - These two are compiled into main() and converted into a hexadecimal text file

Coding & Libraries



- How the Arduino talks with each individual component
  - Any component that you use can be looked up in this library
  - Online reference that allows you to install all necessary info
- The Adafruit website has all the code to run as well for data collection
- Arduino has a reference list for all of the things it knows how to do!
  - https://www.arduino.cc/reference/en/
  - https://arduino-info.wikispaces.com/MegaQuickRef



References

"Arduino - Introduction" (arduino.cc)

Lahart, Justin. "Taking an Open-Source Approach to Hardware". *The Wall Street Journal*. 27 November 2009.

What is an Arduino?

"Programming Arduino Getting Started with Sketches". McGraw-Hill. Nov 8, 2011.

"Arduino - BareMinimum" (arduino.cc)

Documentation for function setup (arduino.cc)

Documentation for function loop (arduino.cc)