What is Arduino?

“What Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments.”

- [http://www.arduino.cc/](http://www.arduino.cc/)

Need cool ideas for projects?

- [http://arduino.cc/playground/](http://arduino.cc/playground/)
What is in your kit?
What is in your kit?

USB Cable
What is in your kit?

Breadboard
What is in your kit?

- Rubber Feet
What is in your kit?

Wires
What is in your kit?

Arduino
What is in your kit?

LEDs
What is in your kit?

Photo Resistor
“Light Sensor”
What is in your kit?

Buttons
What is in your kit?

Potentiometers

“Dials”
What is in your kit?

Resistors
Setup Software and Hardware
Communication Overview

- **Computer**
  - Programs
  - Arduino
  - Messenger

- **Arduino**
  - Does the work
  - Embedding the code

- **Input/Output**
  - Arduino reads input and writes output
Arduino Board
Arduino Board

Path to Computer

Digital

Reset

+5 clock
+5 photoresistor
GND photoresistor
GND clock
to pin 1 clock
to pin 2 clock

Analog

to the photoresistor
Software Orientation
Software Orientation
Software Orientation
Software Orientation
Software Orientation
Software Orientation
Software Orientation
Software Orientation
Template

/**
   * Program Name:
   * Description:
   * Author: <your name>
   */

void setup() {
    // Runs only once at the beginning of the program
}

void loop() {
    // Infinitely loops while Arduino is on
}

Make a template

1. Start a new program

2. Use template code from previous slide

3. Save it as “template”
Make a template

4. Program the Arduino (should do nothing)

5. Go to File -> Sketchbook
Semicolons

- At the end of every line of code;
- There should be a semicolon;
- This is how the computer knows;
- The start and end of an instruction;
- //This does not include comments
- //The computer ignores these!
FirstProject

- In setup:
  - pinMode(13, OUTPUT);
- In loop:
  - digitalWrite(13, HIGH);
Hands On Activity

Computer Science Unplugged
Electrical Rules - General

- Unplug board when building a circuit
- Make sure all connections are plugged in well
- **Always use resistors!** But which resistor to use?
Electrical Rules - General

- Unplug board when building a circuit
- Make sure all connections are plugged in well
- Which resistor to use?

\[ V = I \times R \]

Voltage \hspace{1cm} Current \hspace{1cm} Resistance
Electrical Rules - General

- Unplug board when building a circuit
- Make sure all connections are plugged in well
- Which resistor to use?

\[ 5V = 500mA \times R \]

mA = milliamps
There are 1000 milliamps in 1 amp
Electrical Rules - General

- Unplug board when building a circuit
- Make sure all connections are plugged in well
- Which resistor to use?

\[ R = 1000 \Omega \]
Electrical Rules – Breadboard
Electrical Rules – 5V and Gnd

- Do not mix power and ground!!
- Do not connect power and ground!!

Power = 5V  Gnd = 0V