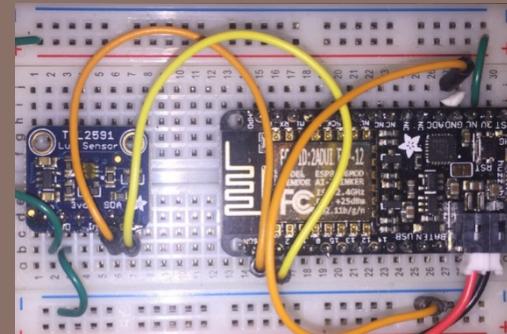
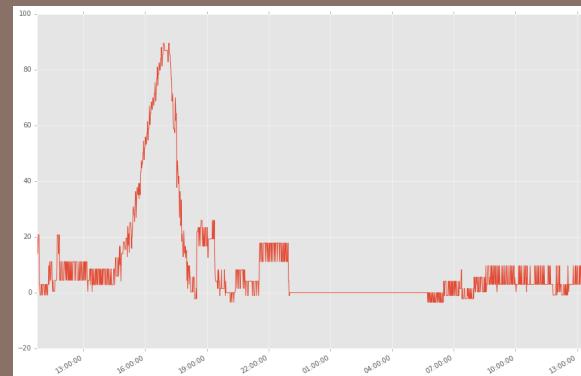


MICROPYTHON IOT HACKATHON

Featuring the ESP8266



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May 2017

Tonight's Agenda

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- Overview lecture
- Build and test system (hardware and software)
- Additional projects (if time permits)

Why Python for IoT?

3

- High-level, easy to prototype ideas and explore options
- Runs on embedded devices



- Python data analysis ecosystem



Array and matrix processing



High level data analysis tools



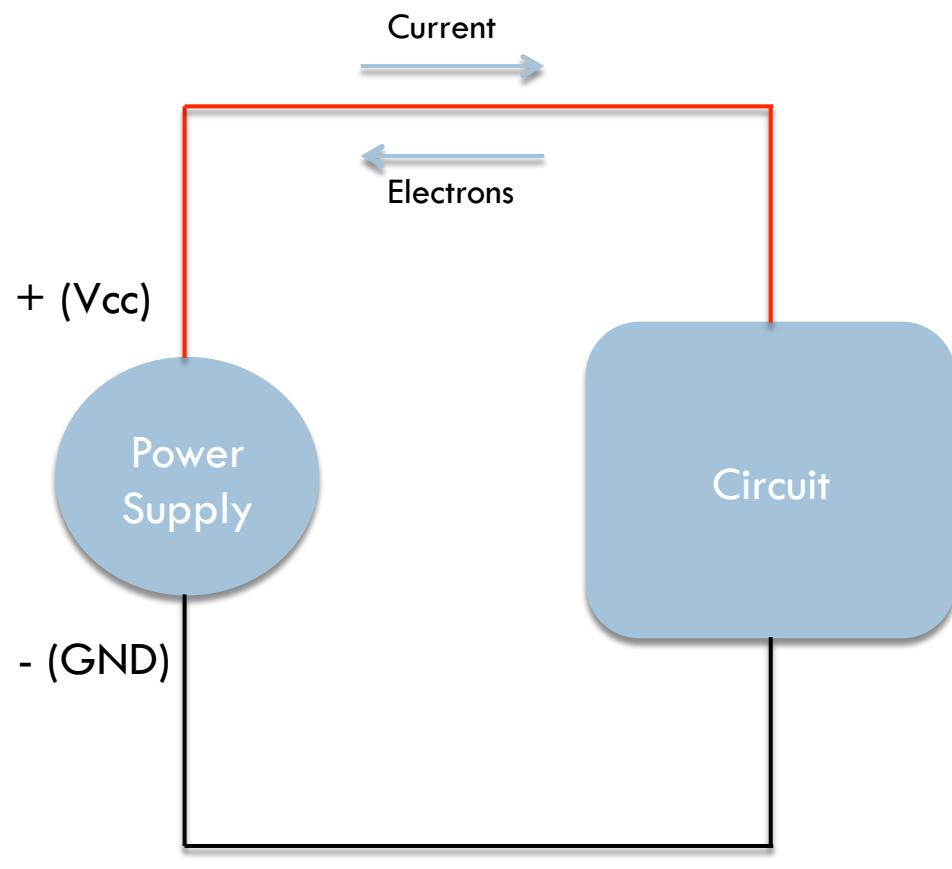
Numerical analysis routines



Machine learning

Basic Electronics

4



Voltage = Electrical Pressure
Current = Flow of electric charge
Resistance = Difficulty to pass electric charge

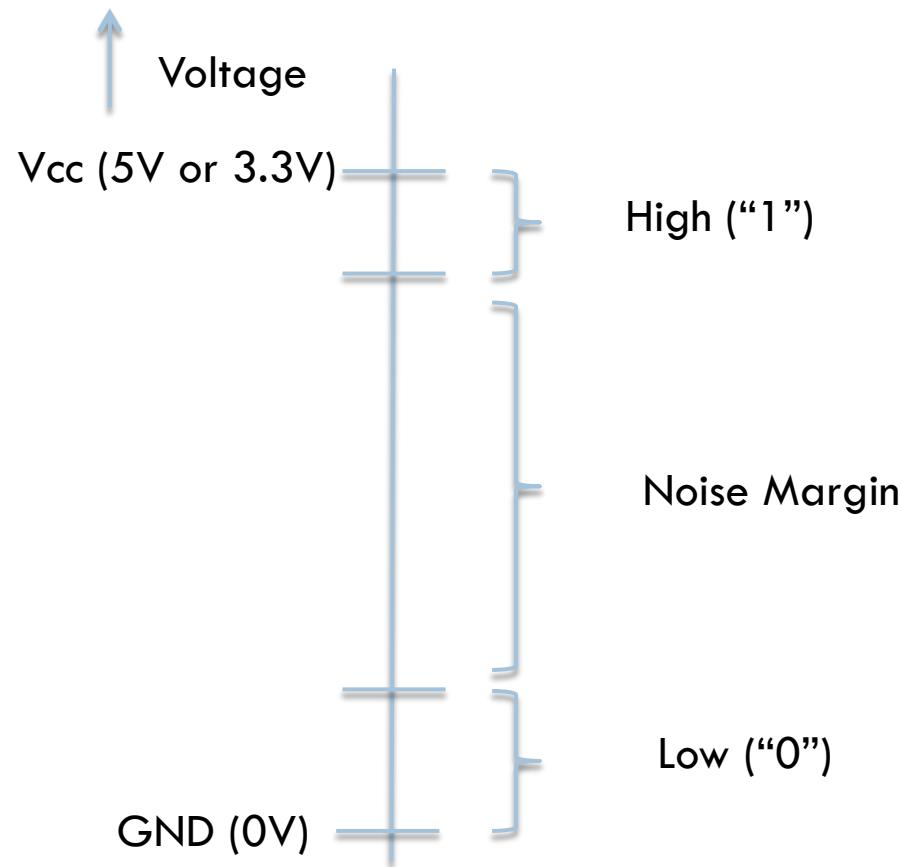
Ohm's Law

$$V = I R$$

arrows pointing to each term:
"voltage" points to V ,
"current" points to I ,
"resistance" points to R .

Digital Logic

5



Cautions

6

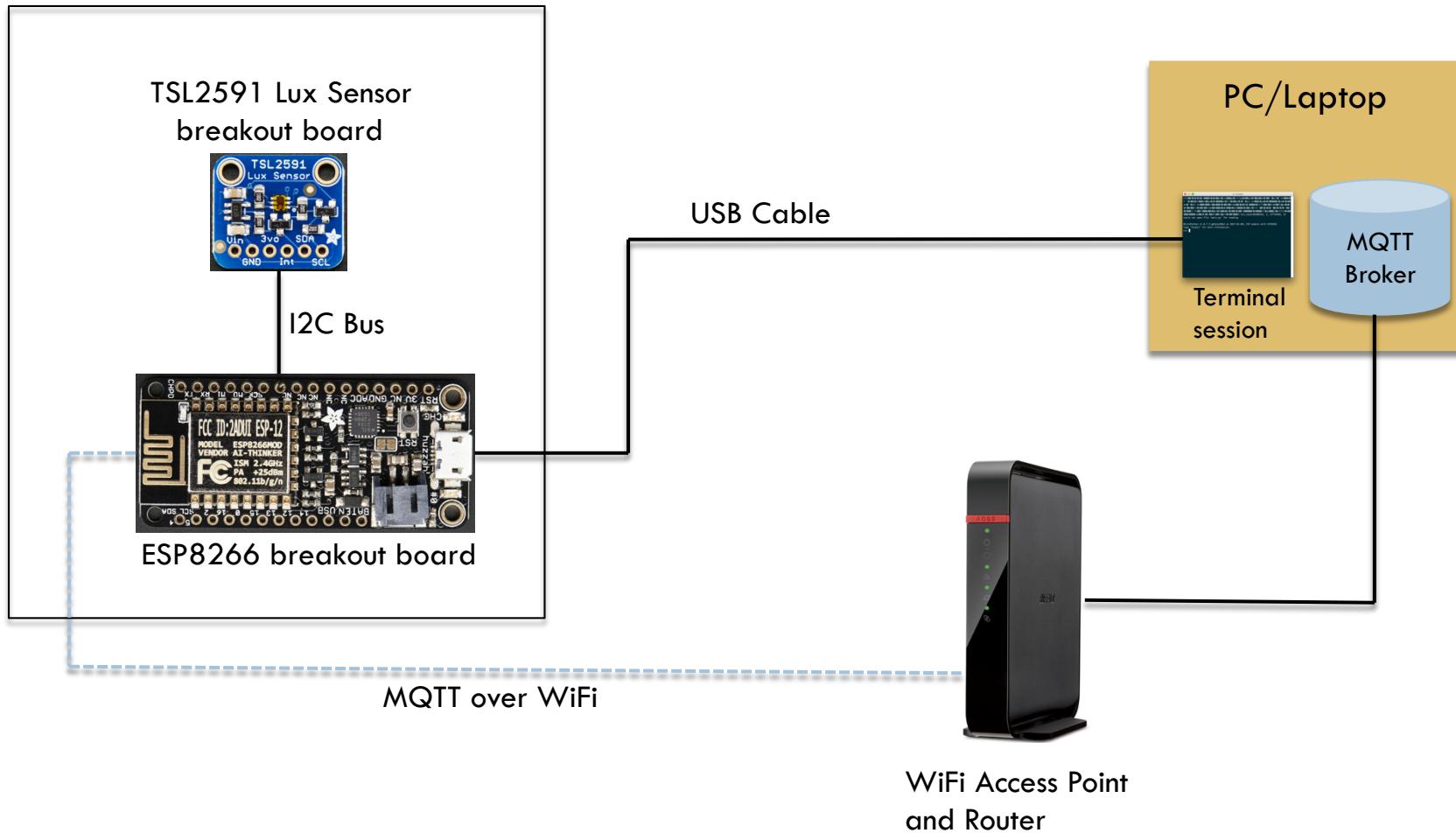
- Do not connect power and ground directly to each other (“shorting”)

- Chips are sensitive to static discharge, be careful
 - ▣ You might touch some metal (e.g. your laptop chassis before handling the electronics)



System Overview

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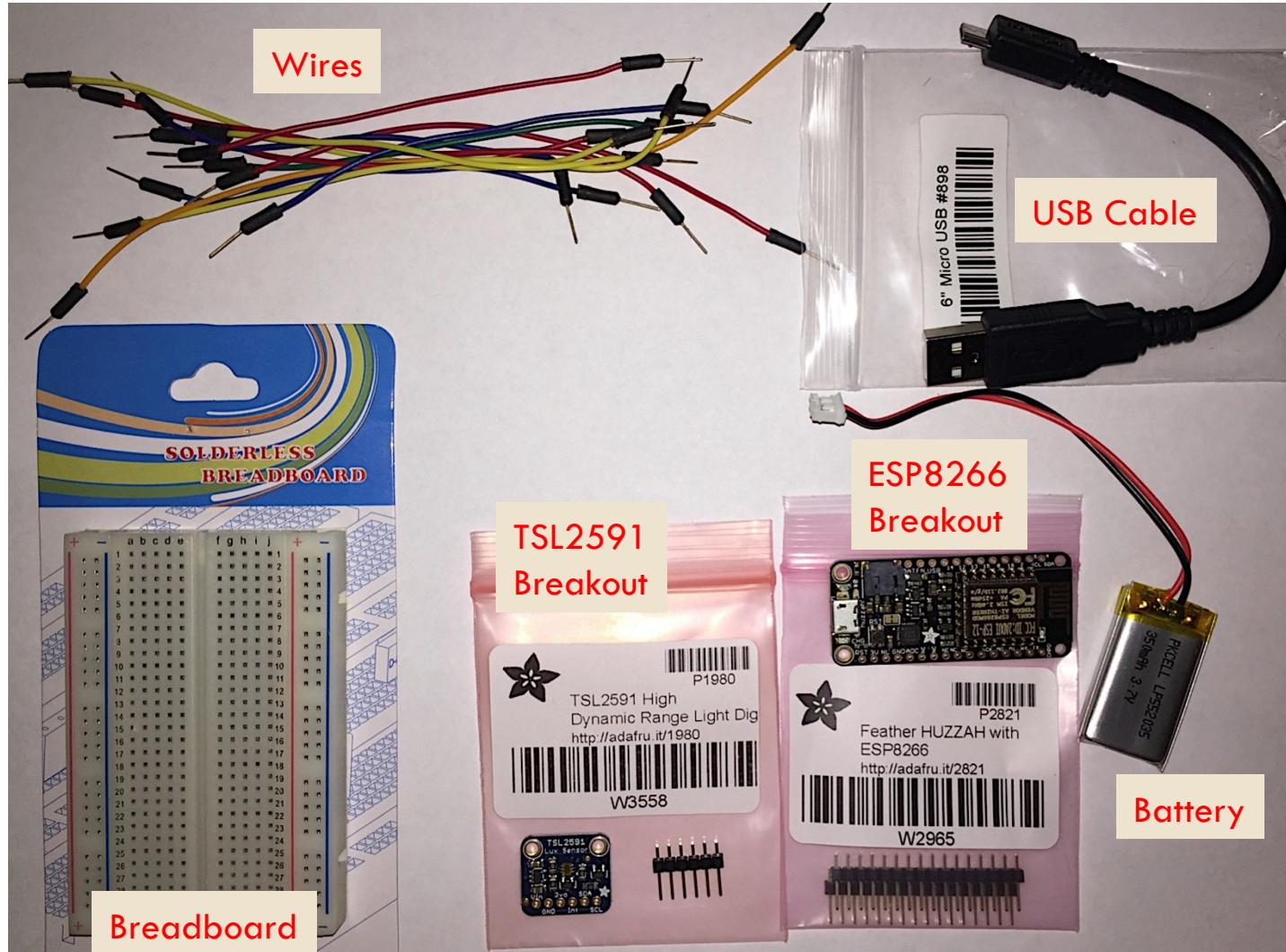
Steps

8

1. Hardware Assembly
2. Firmware and software install
3. Application to read the sensor
4. Messaging with MQTT

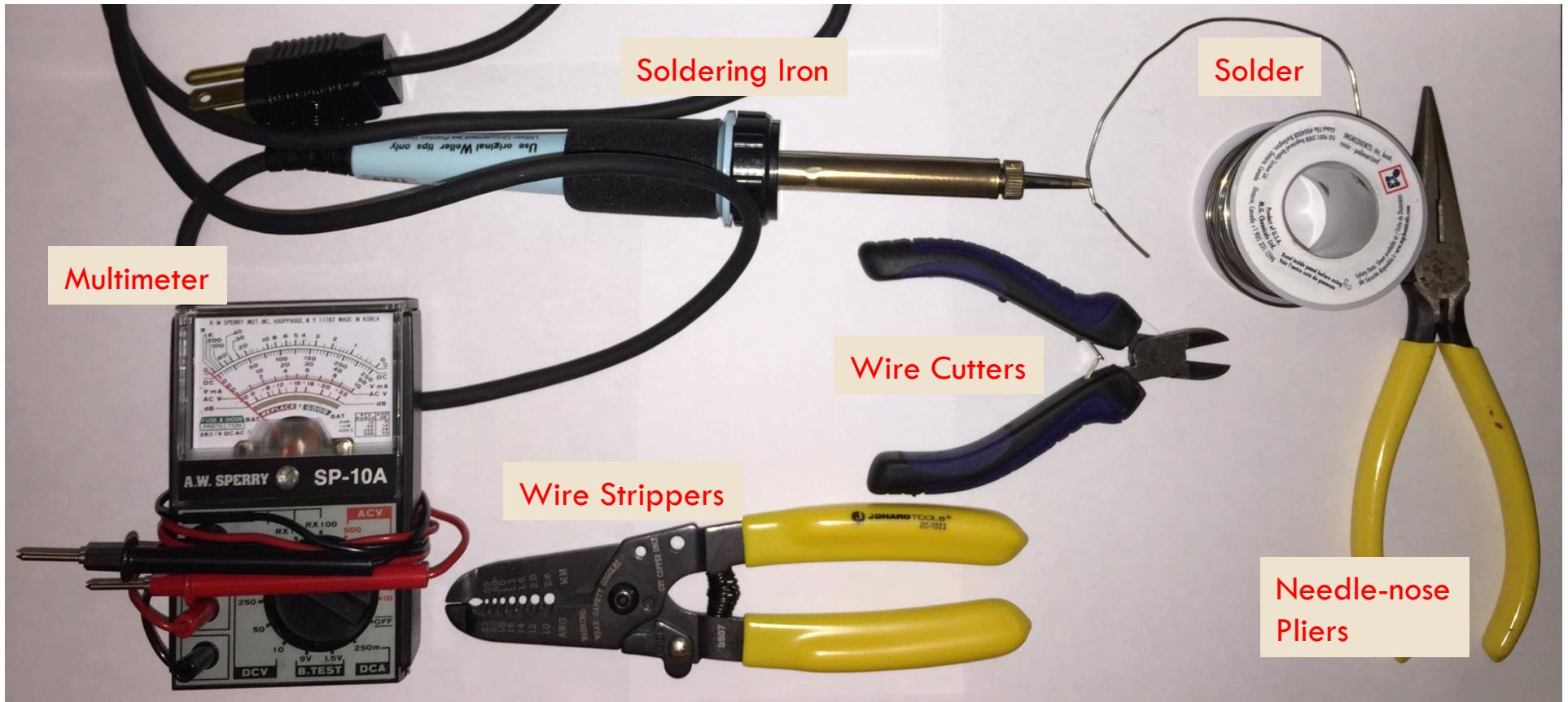
Parts

9



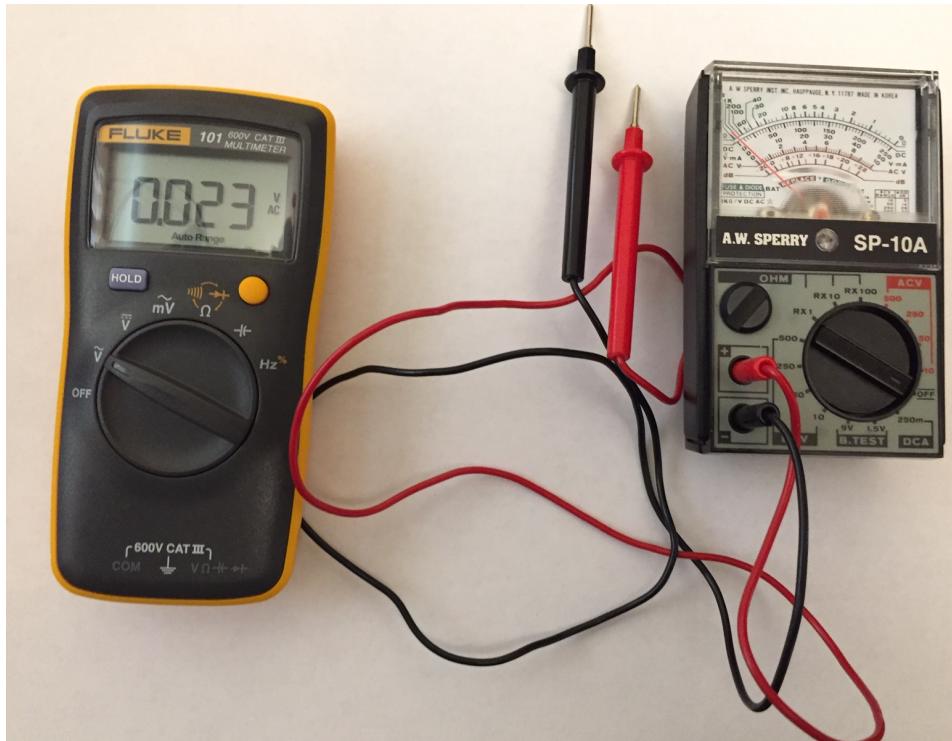
Recommended Tools

10



Multi-testers

11

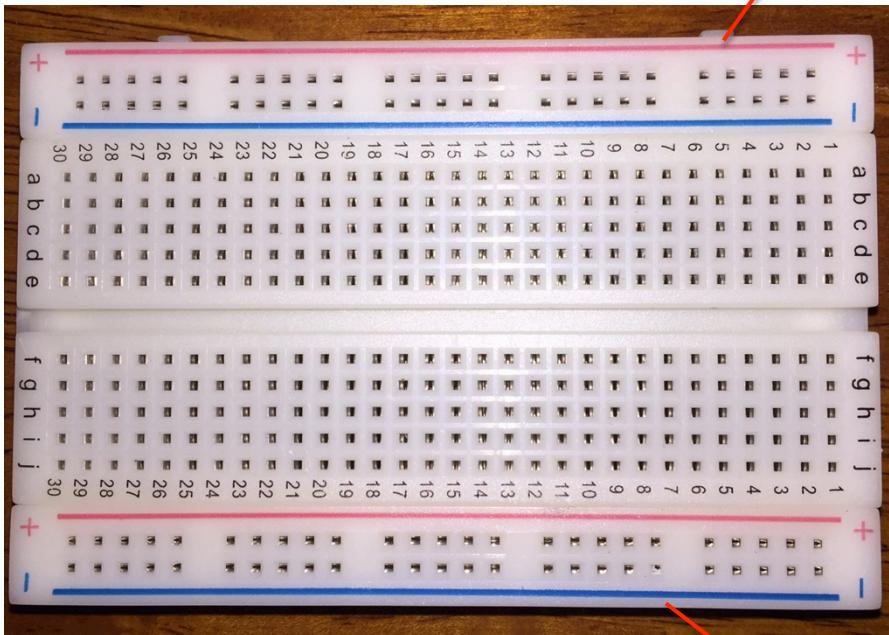


- Measures Volts, Amps, and Ohms (resistance)
- Digital and analog flavors
- Analog may require manually setting the range
- Use resistance to check continuity:
0 Ohms = Connection

Breadboards

12

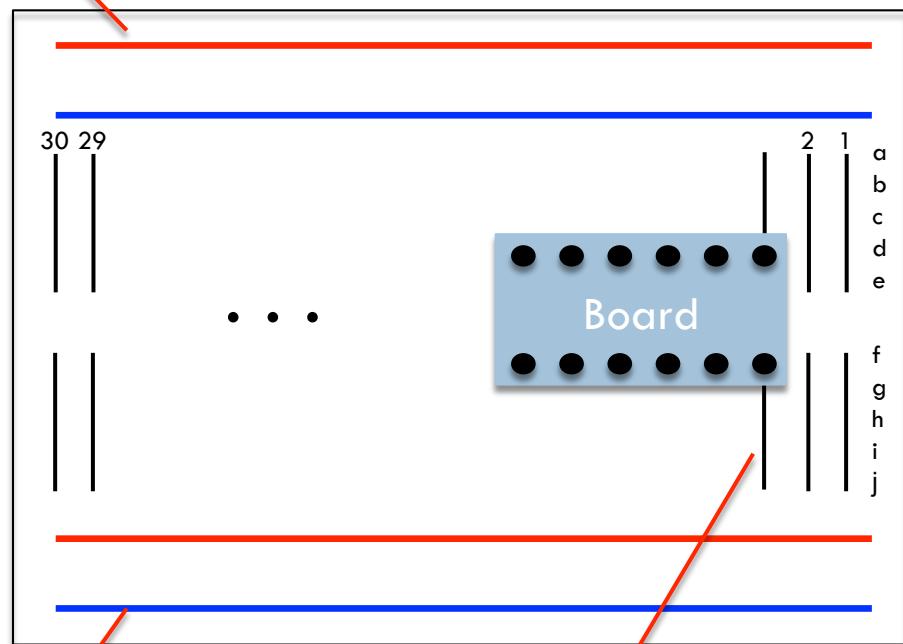
Photo



Use for Power

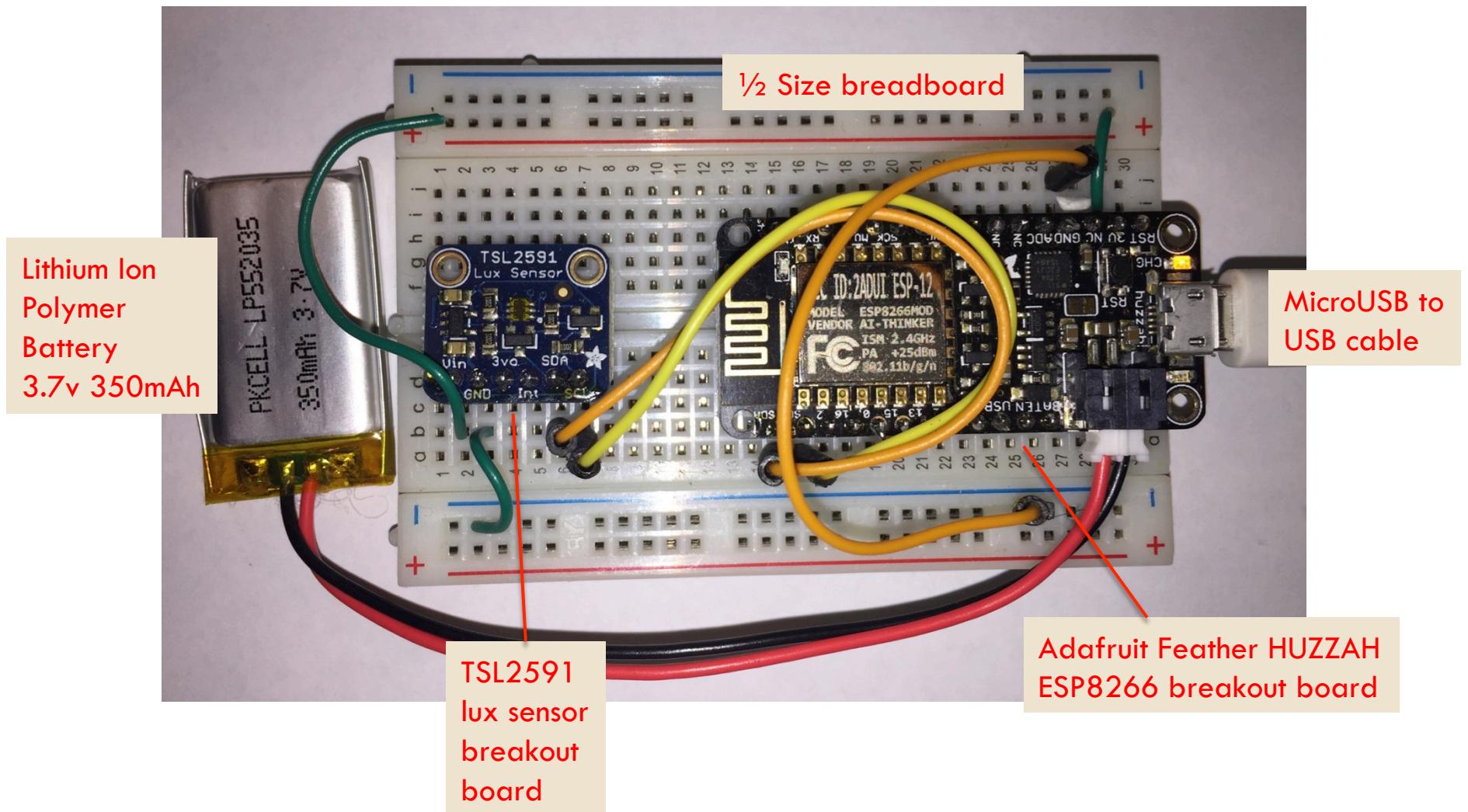
Use for GND

Electrical Connections



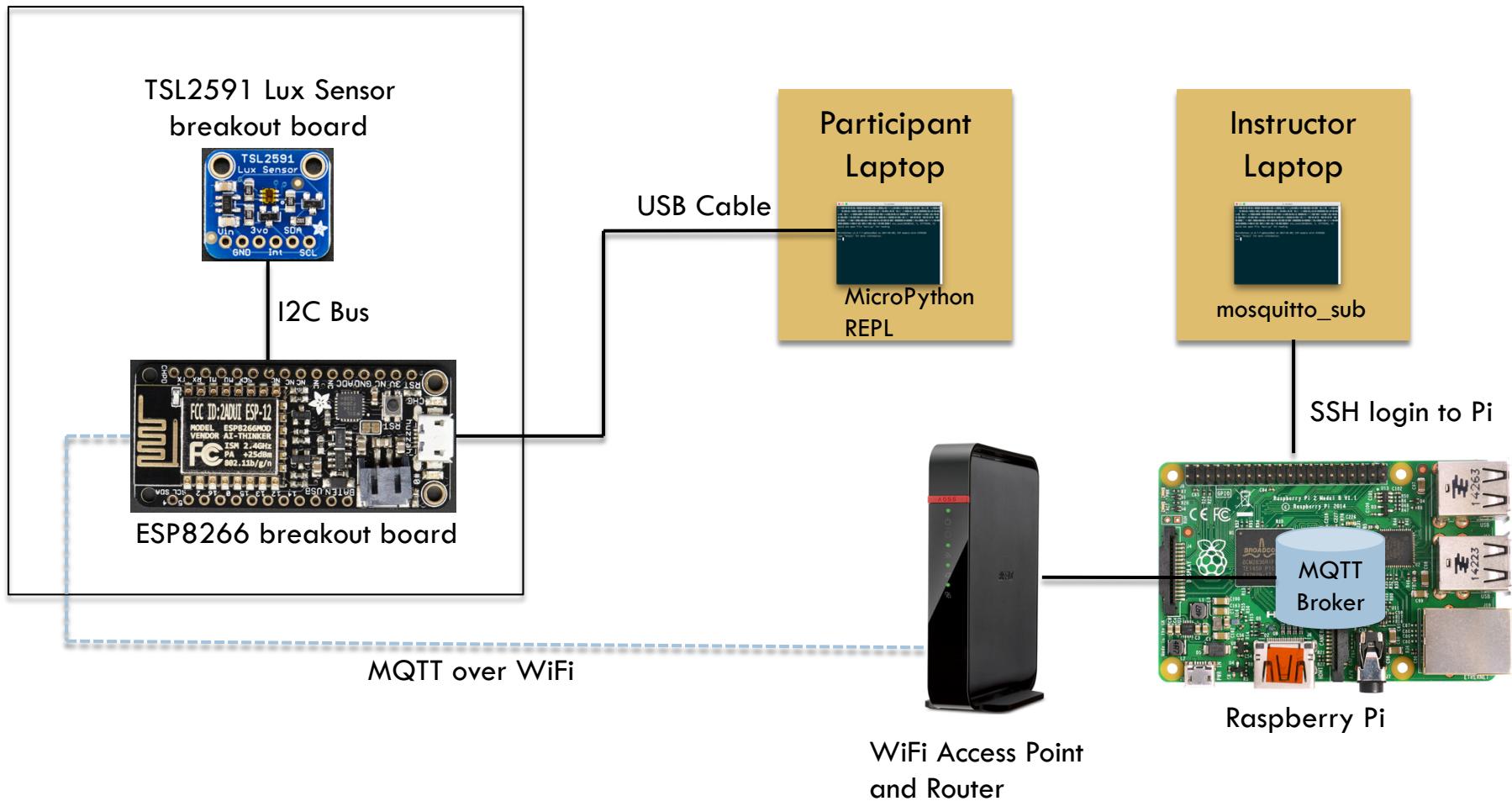
System with Adafruit Feather HUZZAH

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Today's MQTT Setup

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Next Steps

23

- Follow the detailed instructions in the online documentation, starting with “Hardware Assembly”
- You can skip the section on the MQTT broker – you can connect to my Raspberry Pi
- If you get done early, take a look at the extra projects section. Some projects you might try:
 - Graph the light data in Jupyter
 - Turn on an LED
 - Read a temperature sensor
 - Read a door open/close sensor
- Feel free to ask for help!

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Thank You

Questions?

More information

Email: jeff@data-ken.org

Hackathon Tutorial: <http://micropython-iot-hackathon.readthedocs.io/en/latest/>

Website and blog: <https://data-ken.org>

ThingFlow: <https://github.com/mpi-sws-rse/thingflow-python>