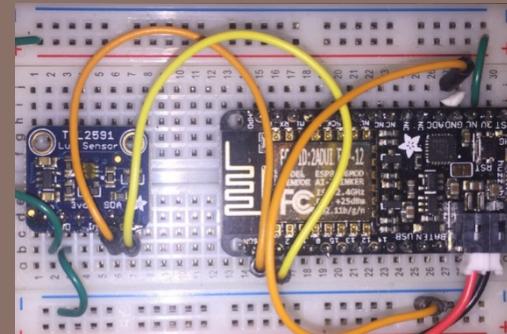
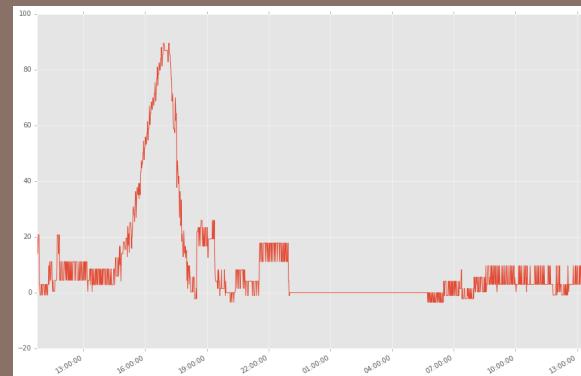


MICROPYTHON IOT HACKATHON

Featuring the ESP8266



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January 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



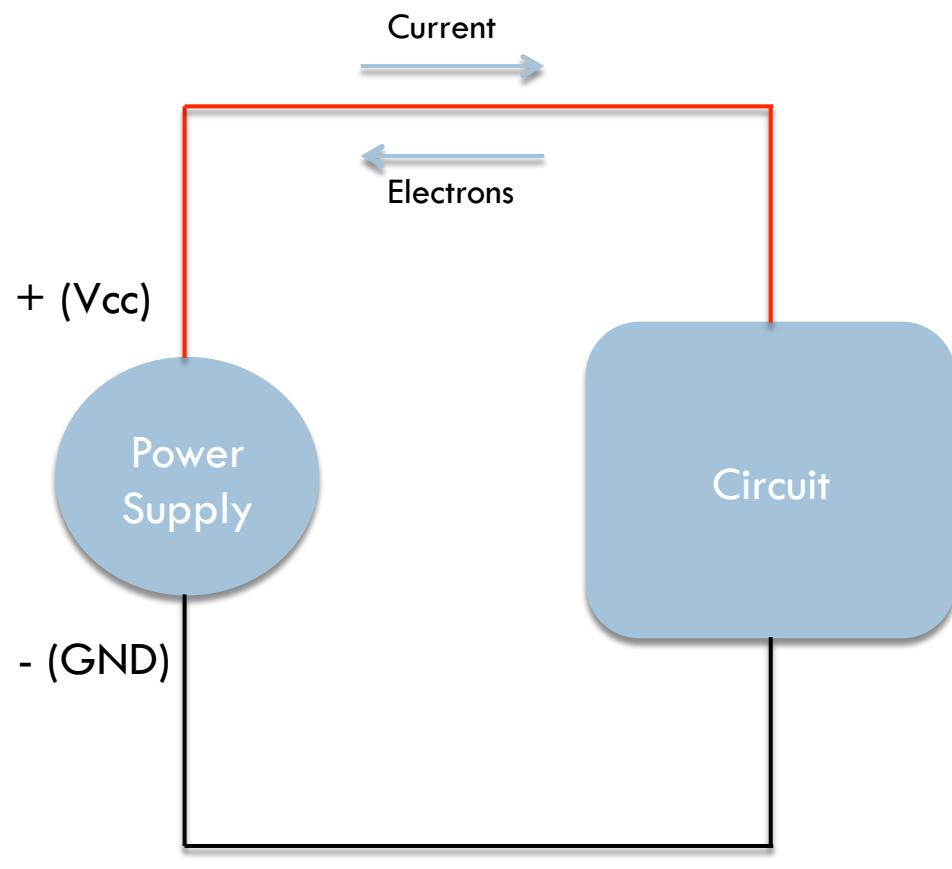
Numerical analysis routines



Machine learning

Basic Electronics

4



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

Ohm's Law

$$V = I R$$

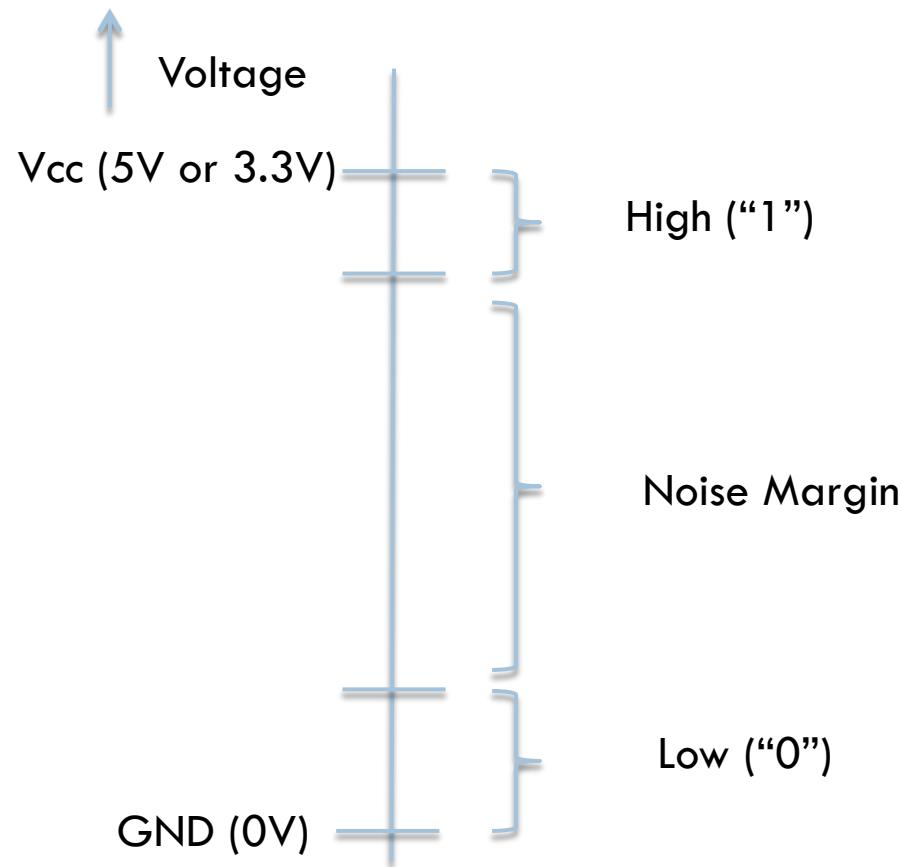
resistance

voltage current

The equation $V = I R$ is shown with three arrows pointing to its components: 'voltage' points to the first 'V', 'current' points to the 'I', and 'resistance' points to the 'R'.

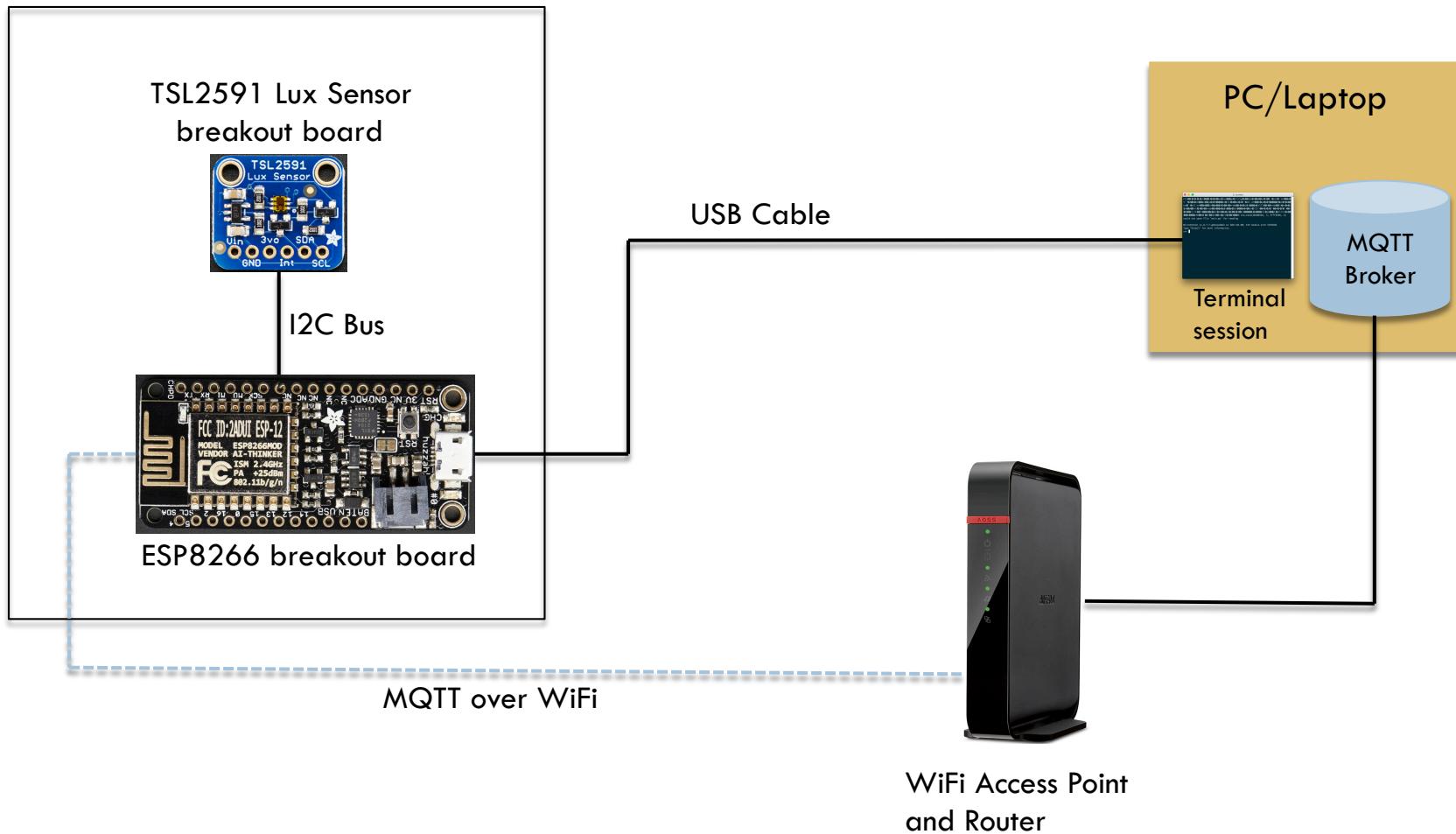
Digital Logic

5



System Overview

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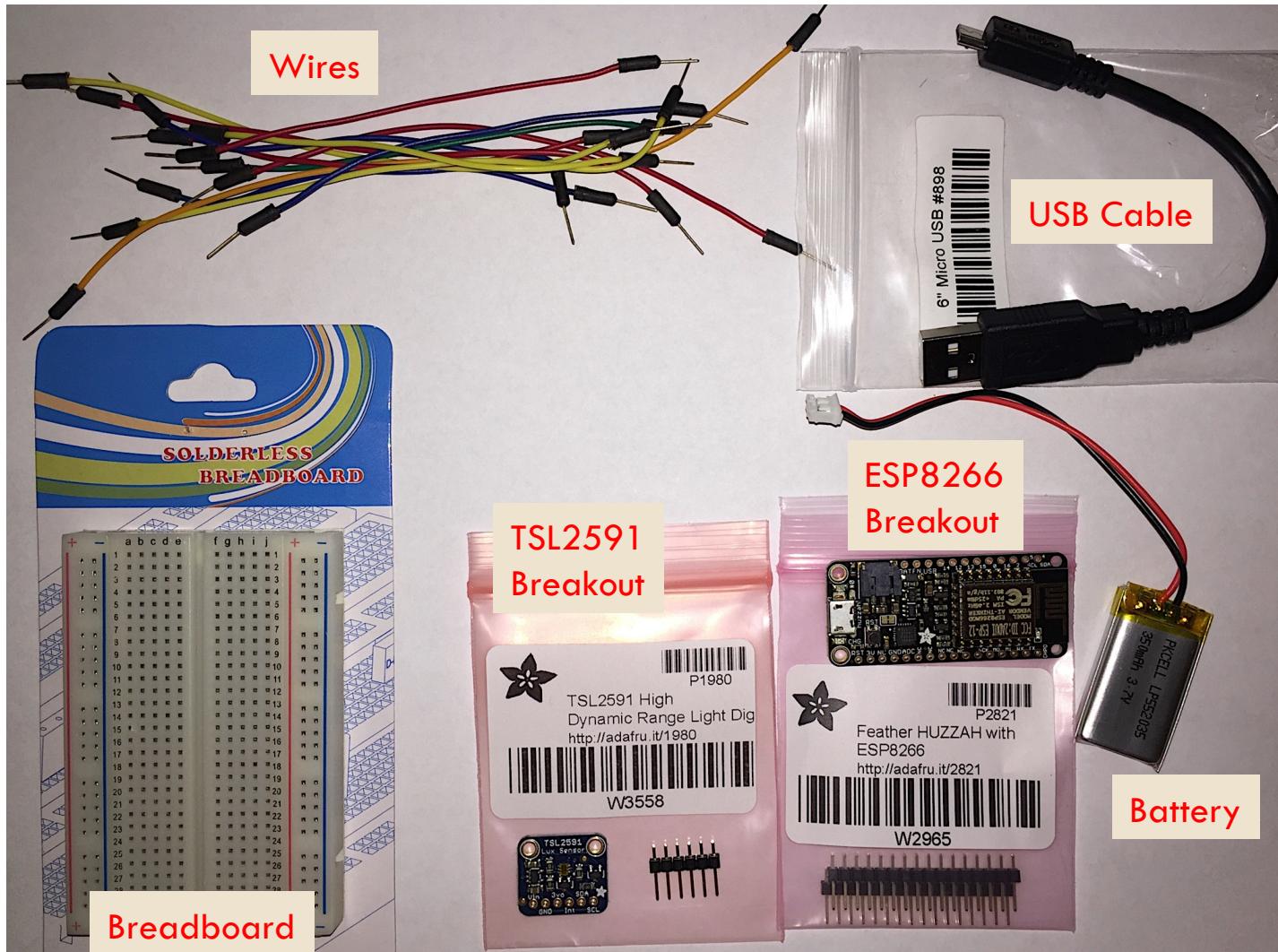
Steps

7

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

Parts

8



Recommended Tools

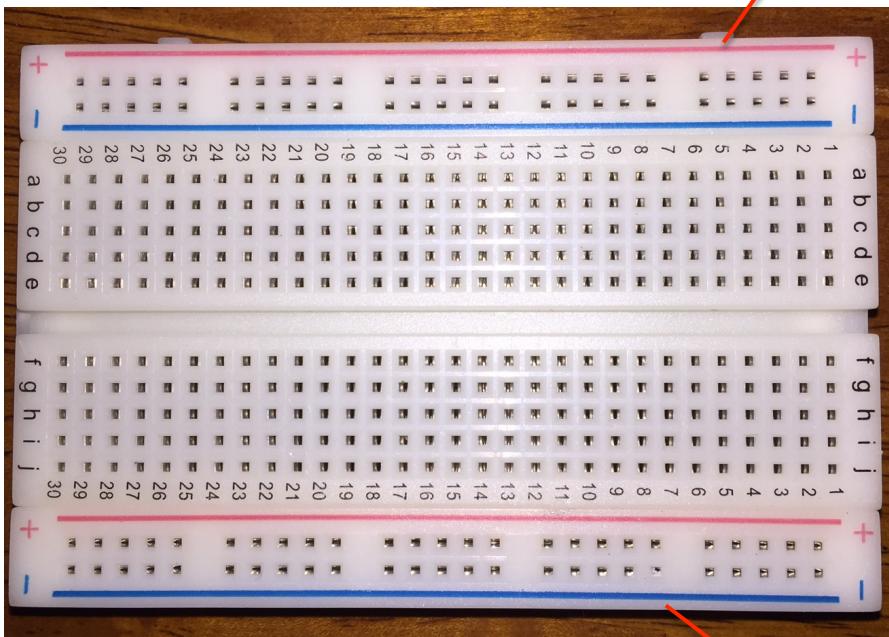
9



Breadboards

10

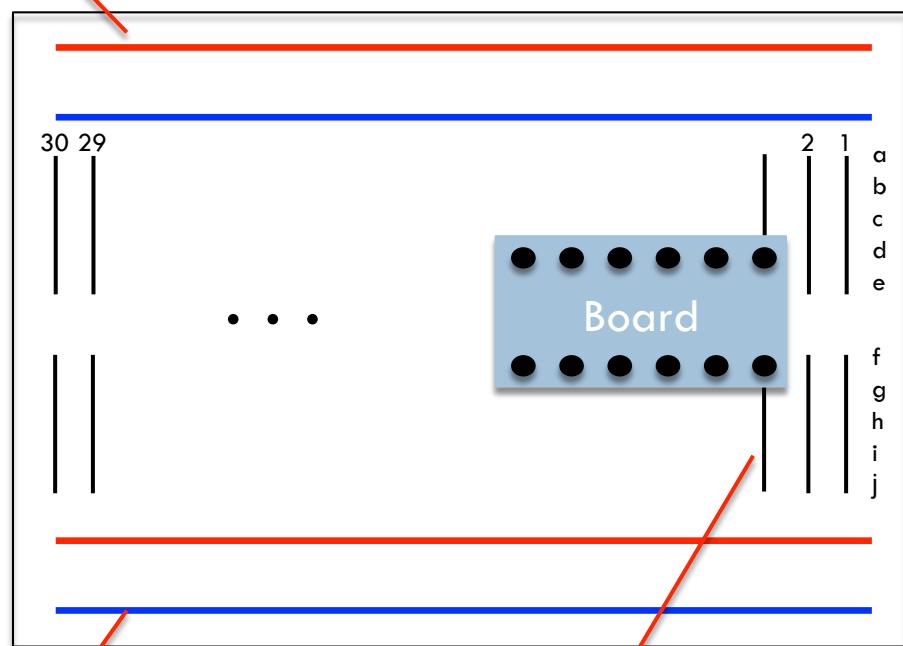
Photo



Use for Power

Use for GND

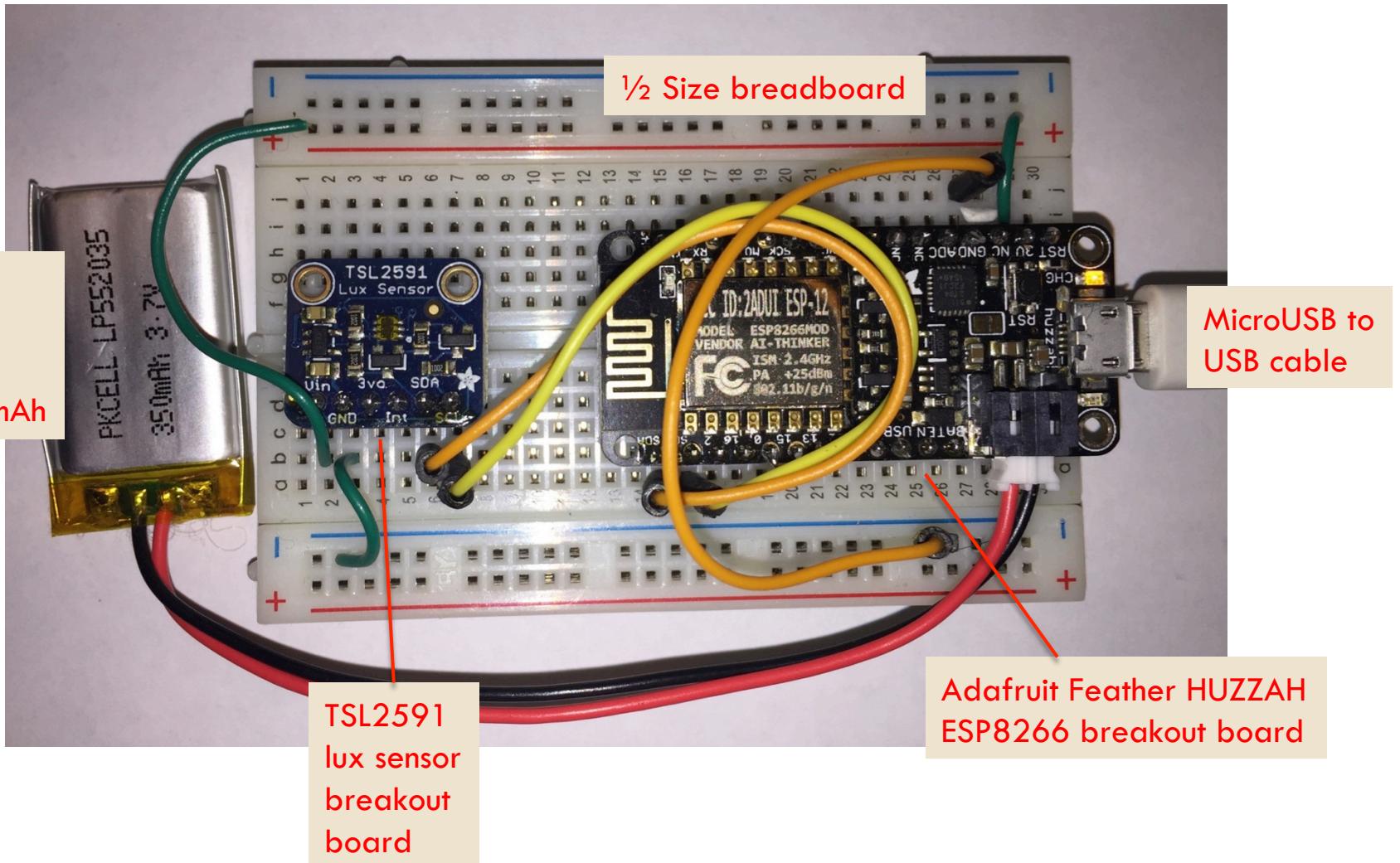
Electrical Connections



Use for pin connections

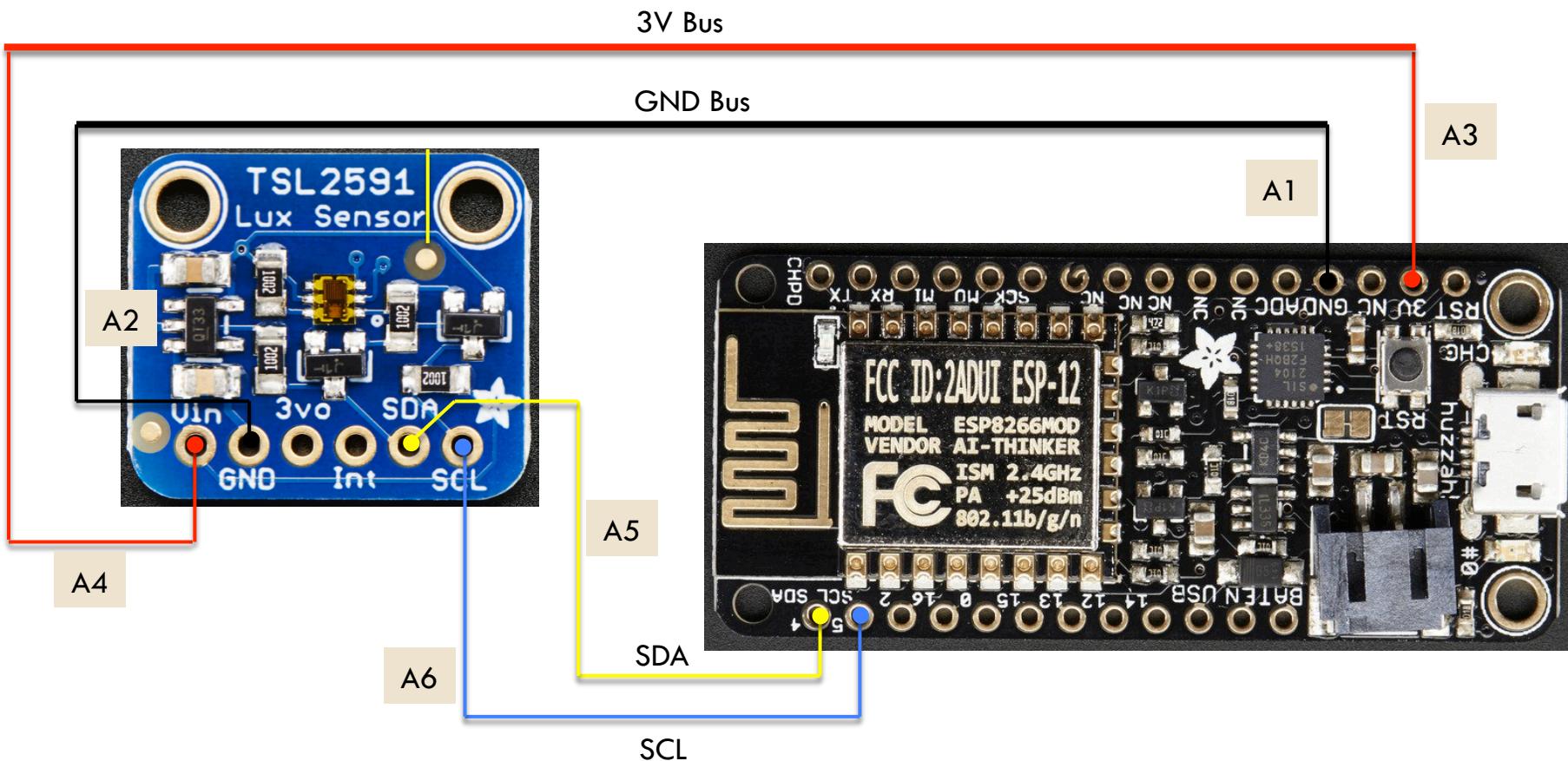
System with Adafruit Feather HUZZAH

11



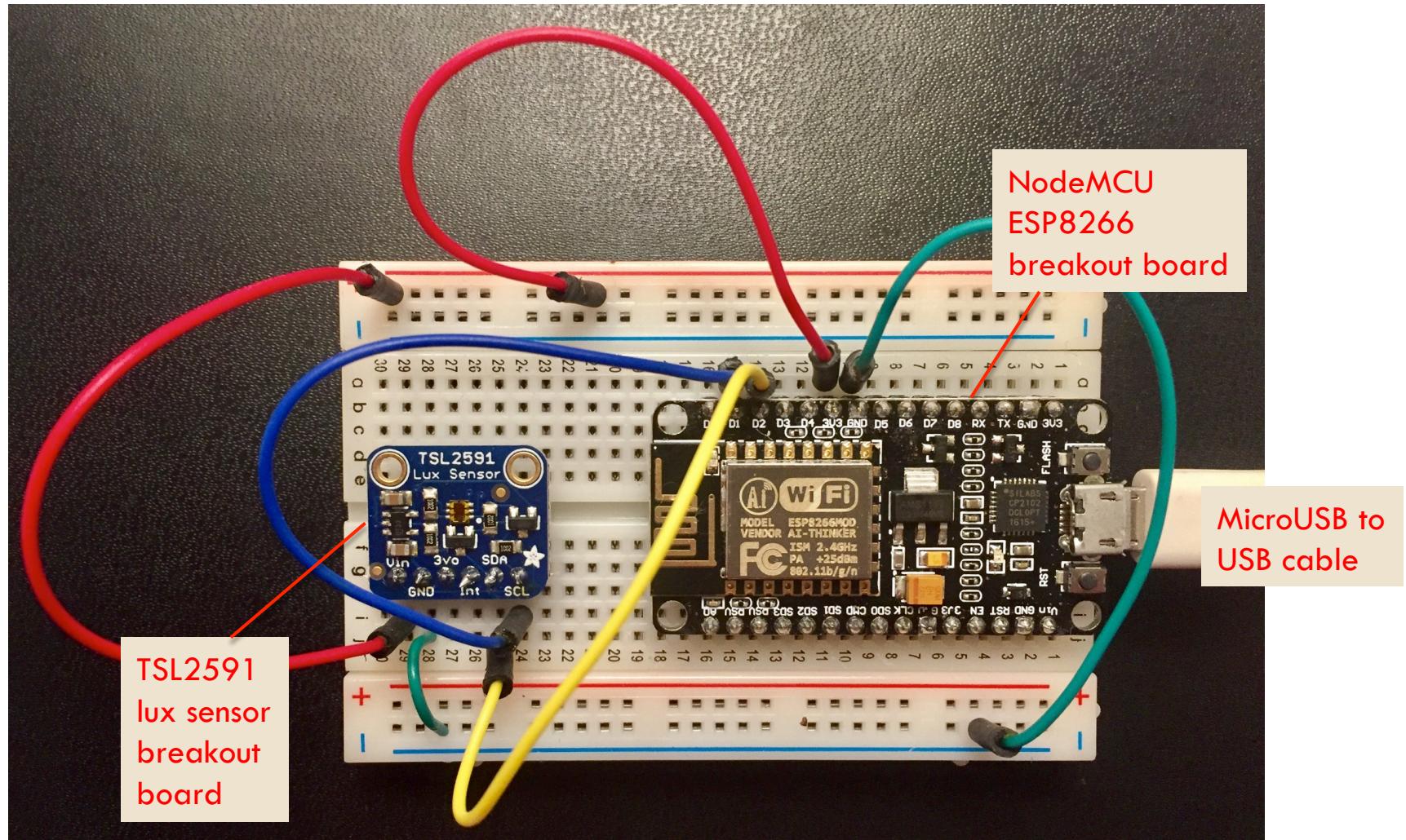
Feather HUZZAH: Wiring Diagram

12



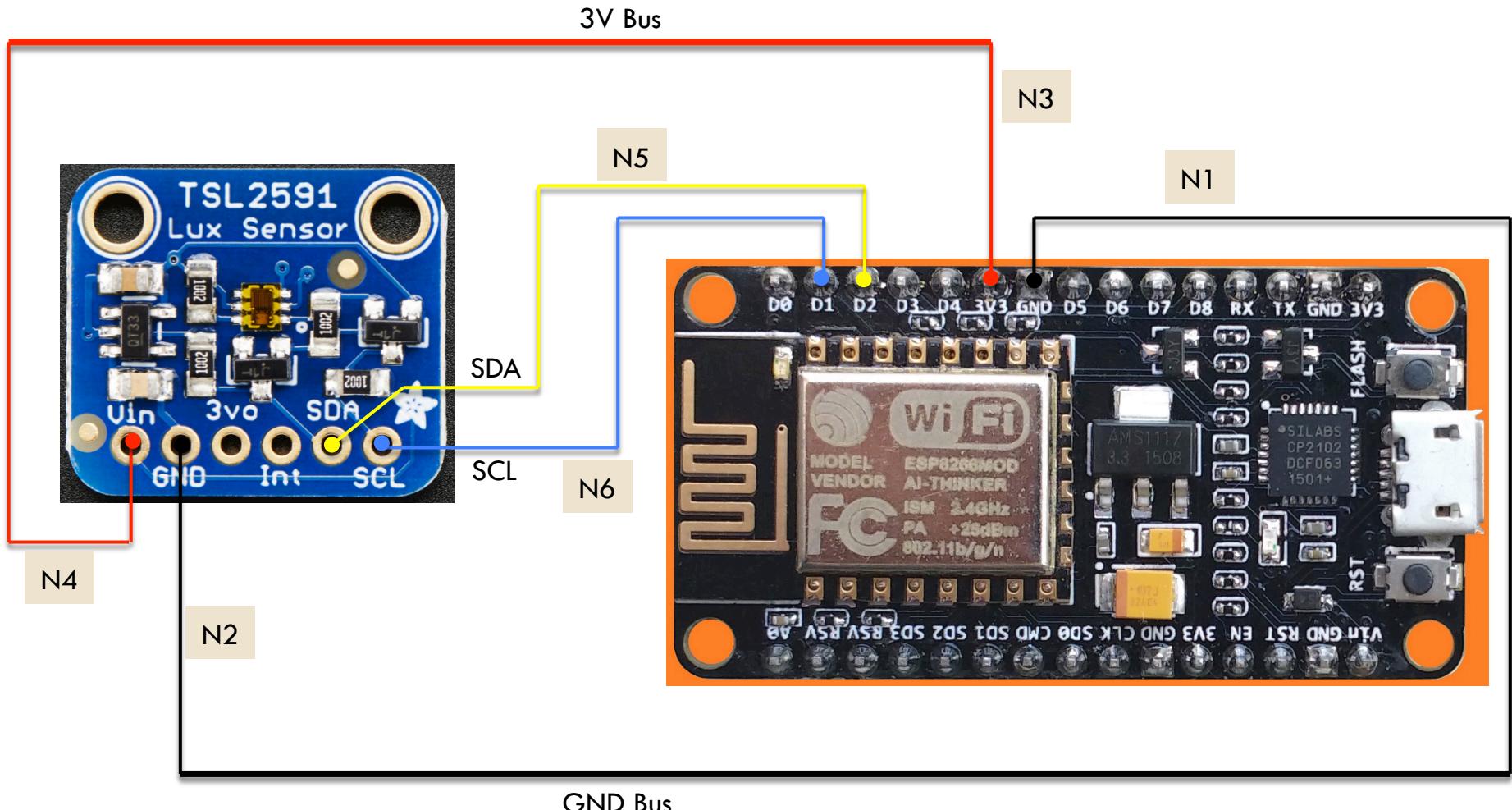
System with NodeMCU

13



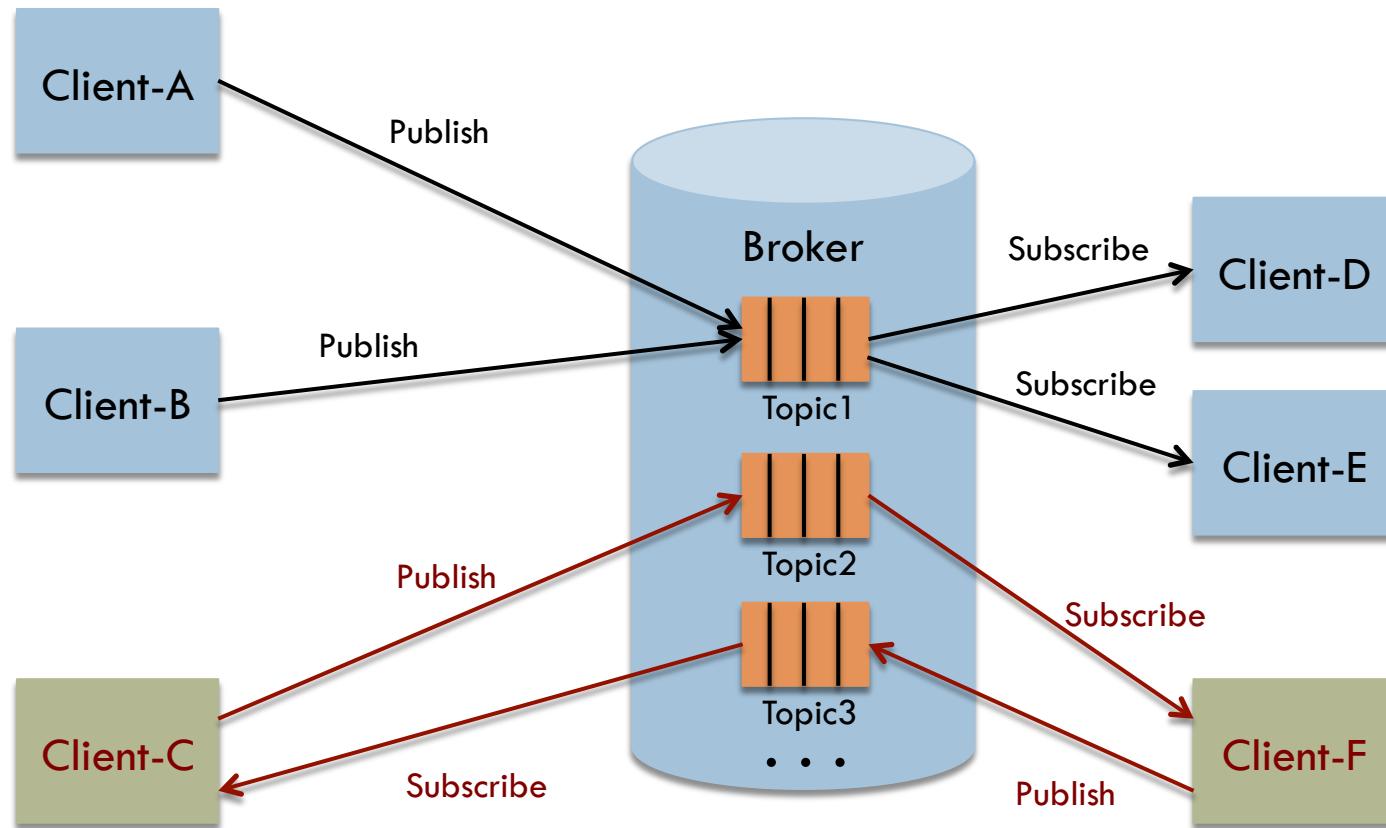
NodeMCU: Wiring Diagram

14



MQTT

15



Server.py

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```
mqtt.select(lambda m:(m.payload).decode('utf-8'))\n    .from_json(constructor=SensorEvent)\n    .select(lambda evt: SensorEvent(sensor_id=evt.sensor_id,\n                                    ts=time.time(),\n                                    val=evt.val))\n    .csv_writer(filename)
```

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Thank You

Questions?

More information

Email: jeff@data-ken.org

Hackathon Tutorial: <https://readthedocs.org/search/?q=micropython-iot-hackathon>

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

AntEvents: <https://github.com/mpi-sws-rse/antevents-python>