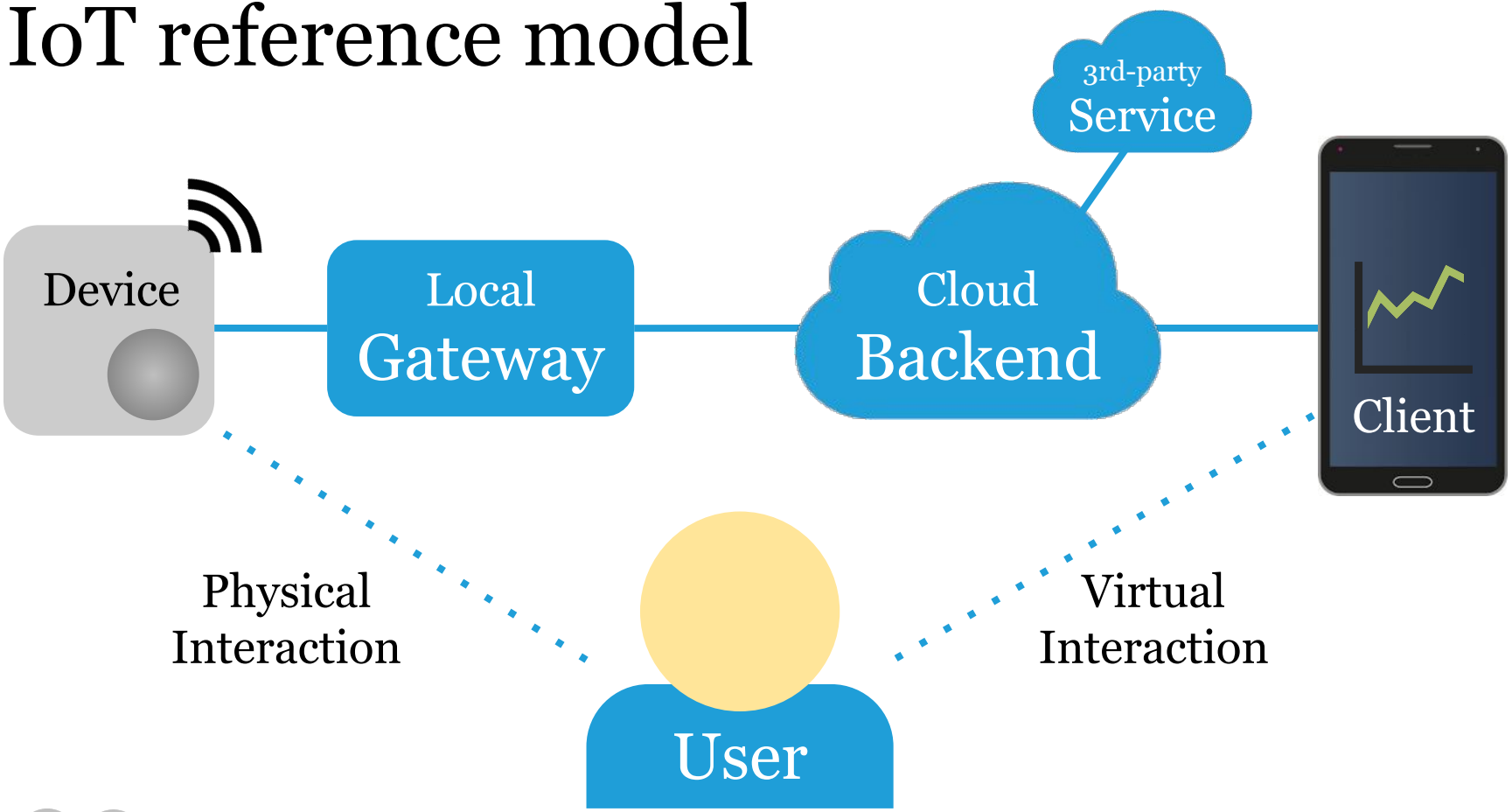
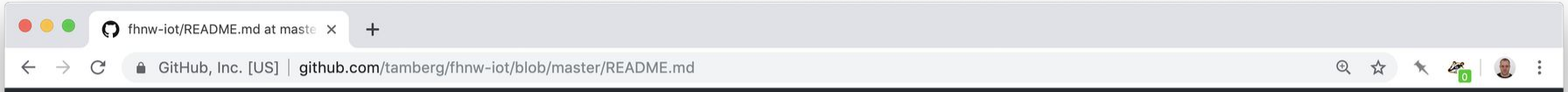
Teaching IoT with Open Hardware and GitHub Classroom

Slides on Twitter @tamberg

IoT reference model





IoT Engineering

Slides and code examples

1. Introduction to the Internet of Things
2. Microcontrollers, Sensors & Actuators
3. Sending Sensor Data to IoT Platforms
4. Internet Protocols, HTTP and CoAP
5. Local Connectivity with Bluetooth LE
6. Raspberry Pi as a Local IoT Gateway
7. Messaging Protocols and Data Formats
8. Long Range Connectivity with LoRaWAN
9. Dashboards and Apps for Sensor Data
10. Rule-based Integration of IoT Devices
11. Voice Control for Connected Products
12. Raspberry Pi as an IoT Edge Device
13. Assessment
14. Demo Day

Fachhochschule Nordwestschweiz
Hochschule für Technik

IoT Hardware for CS Bachelor Students

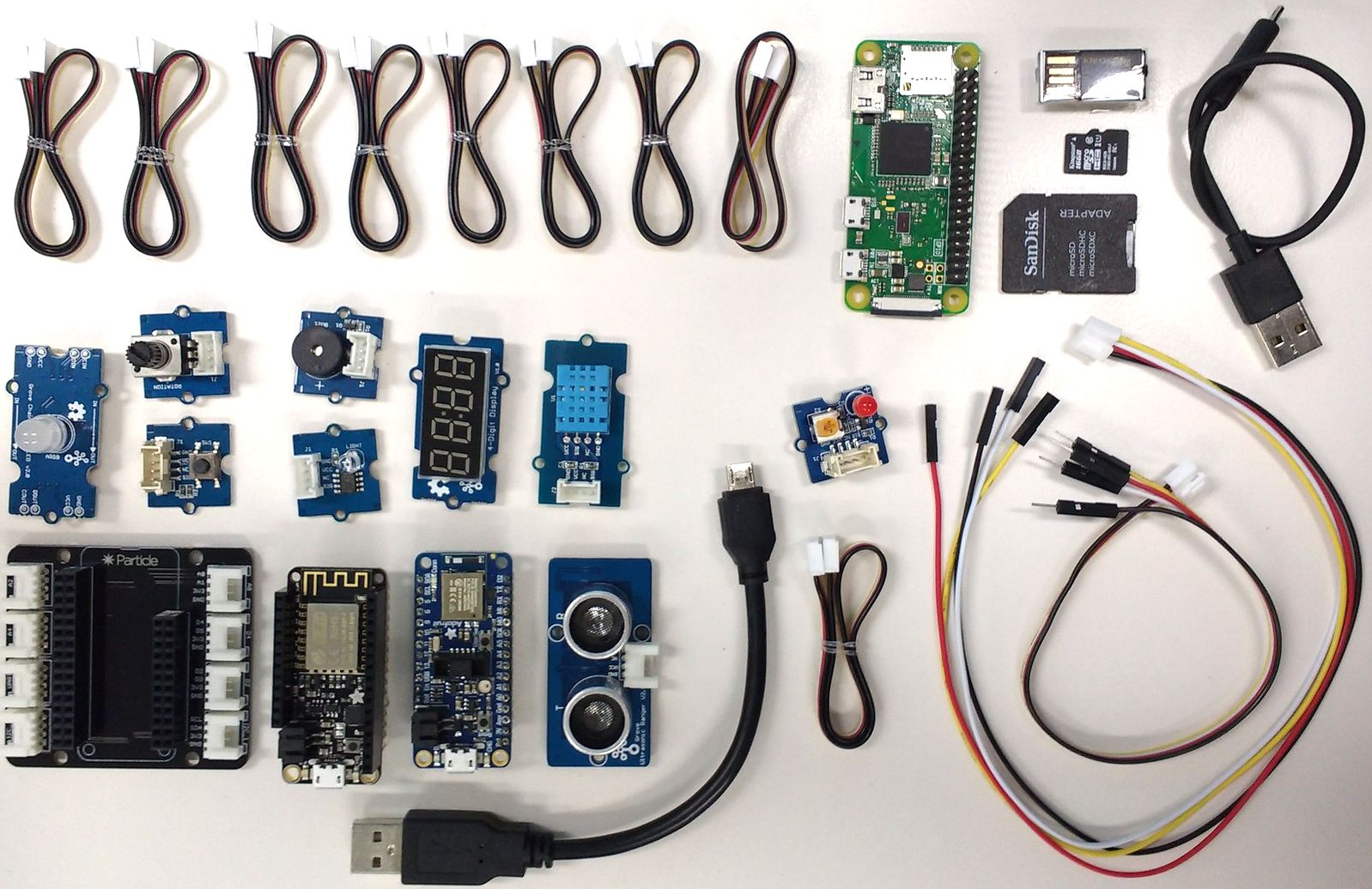
 thomas.amberg@fhnw.ch, 24.01.2019

Abstract

Options and thoughts around Internet of Things hardware for computer science bachelor students.

Introduction

The following options were collected during the evaluation of IoT hardware for the course *IoT Engineering* [0] at FHNW, the University of Applied Sciences and Arts Northwestern Switzerland.


Particle
SanDisk
ADAPTER
microSD
microSDHC
microSDXC

Home

Thomas Amberg edited this page on 3 Jun · 76 revisions

Edit New Page

IoT Engineering Wiki

The Wiki contains tools and hardware setup instructions which are referenced by lessons.

Found a typo or something missing? Submit an issue.

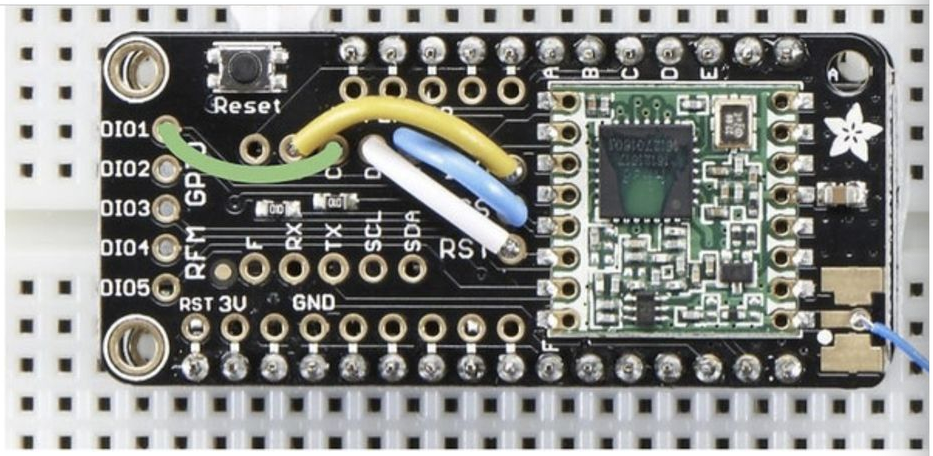
Development tools

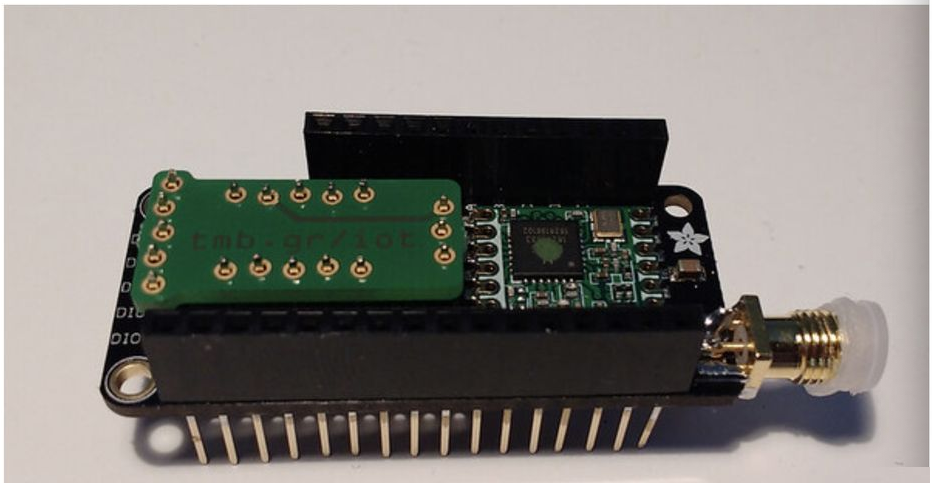
Development environment

- Arduino
- VS Code

FeatherWing RFM95W · tambe

GitHub, Inc. [US] | github.com/tamberg/fhnw-iot/wiki/FeatherWing-RFM95W





FeatherWing RFM95W · tambe

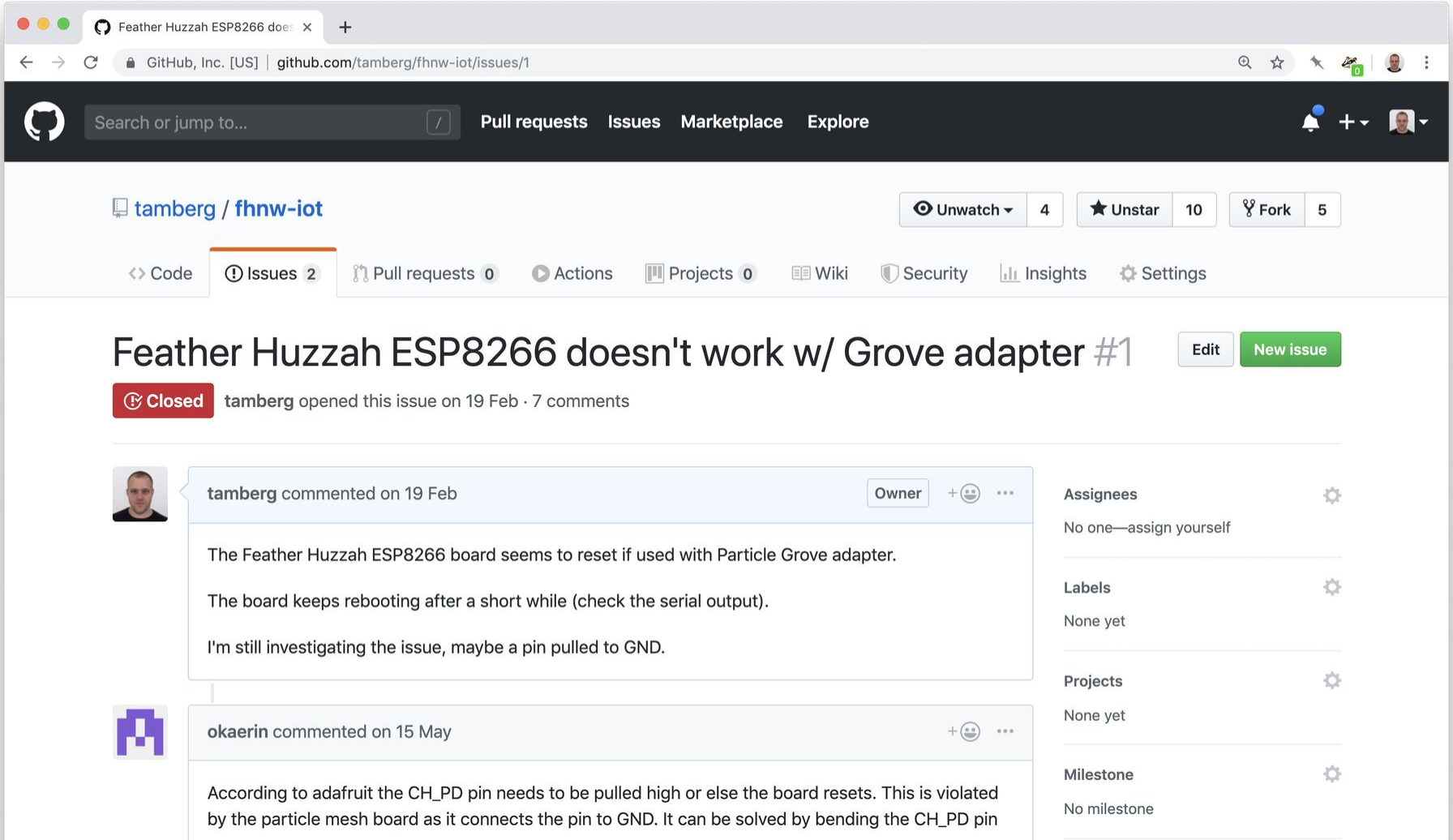
GitHub, Inc. [US] | github.com/tamberg/fhnw-iot/wiki/FeatherWing-RFM95

Feather Huzzah ESP8266

```
const lmic_pinmap lmic_pins = {
    .nss = 2, // CS
    .rxtx = LMIC_UNUSED_PIN,
    .rst = 16, // RST
    .dio = {
        15, // DIO0 = IRQ
        0,  // DIO1
        LMIC_UNUSED_PIN
    }
};
```

Feather nRF52840 Express

```
const lmic_pinmap lmic_pins = {
    .nss = 5, // CS
    .rxtx = LMIC_UNUSED_PIN,
    .rst = 6, // RST
    .dio = {
        10, // DIO0 = IRQ
        9,  // DIO1
        LMIC_UNUSED_PIN
    }
};
```


Feather Huzzah ESP8266 does
GitHub, Inc. [US] | github.com/tamberg/fhnw-iot/issues/1
Search or jump to...
Pull requests
Issues
Marketplace
Explore
tamberg / fhnw-iot
Unwatch 4
Unstar 10
Fork 5
Code
Issues 2
Pull requests 0
Actions
Projects 0
Wiki
Security
Insights
Settings
Feather Huzzah ESP8266 doesn't work w/ Grove adapter #1
Edit
New issue
Closed
tamberg opened this issue on 19 Feb · 7 comments
tamberg commented on 19 Feb
Owner
The Feather Huzzah ESP8266 board seems to reset if used with Particle Grove adapter.
The board keeps rebooting after a short while (check the serial output).
I'm still investigating the issue, maybe a pin pulled to GND.
okaerin commented on 15 May
According to adafruit the CH_PD pin needs to be pulled high or else the board resets. This is violated by the particle mesh board as it connects the pin to GND. It can be solved by bending the CH_PD pin
Assignees
No one—assign yourself
Labels
None yet
Projects
None yet
Milestone
No milestone

Feather Huzzah ESP8266 does

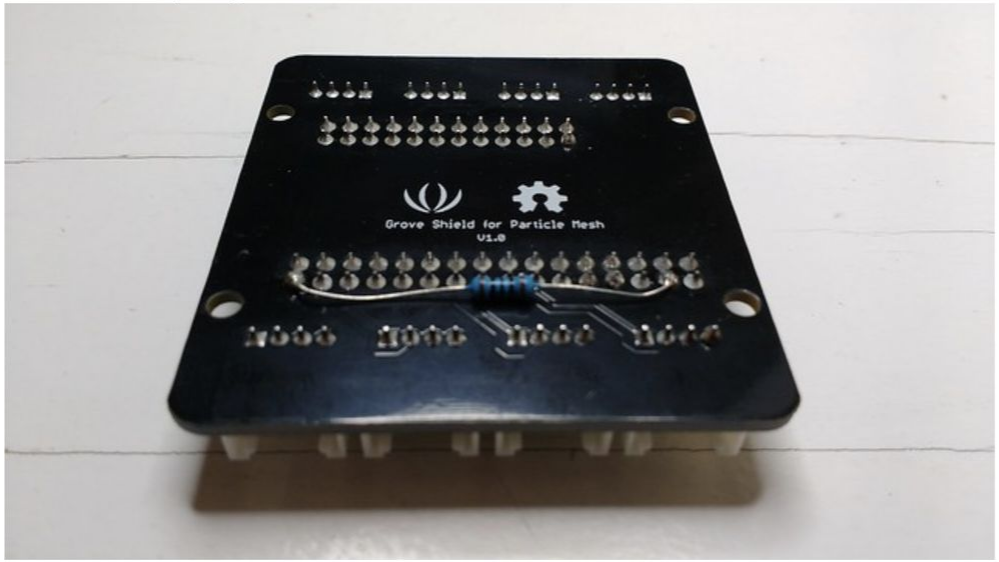
GitHub, Inc. [US] | github.com/tamberg/fhnw-iot/issues/1

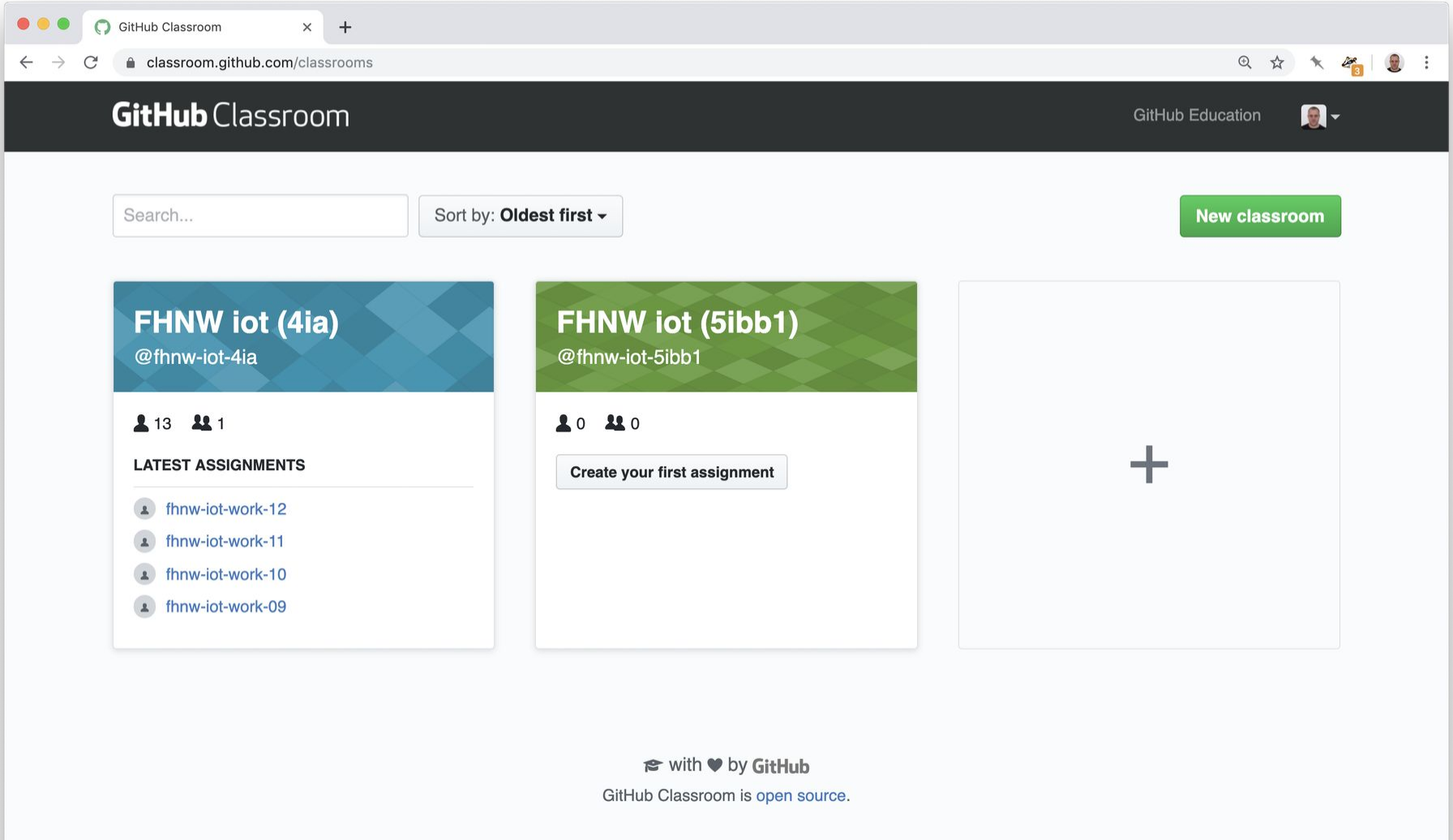
Closed **Feather Huzzah ESP8266 doesn't work w/ Grove adapter** #1

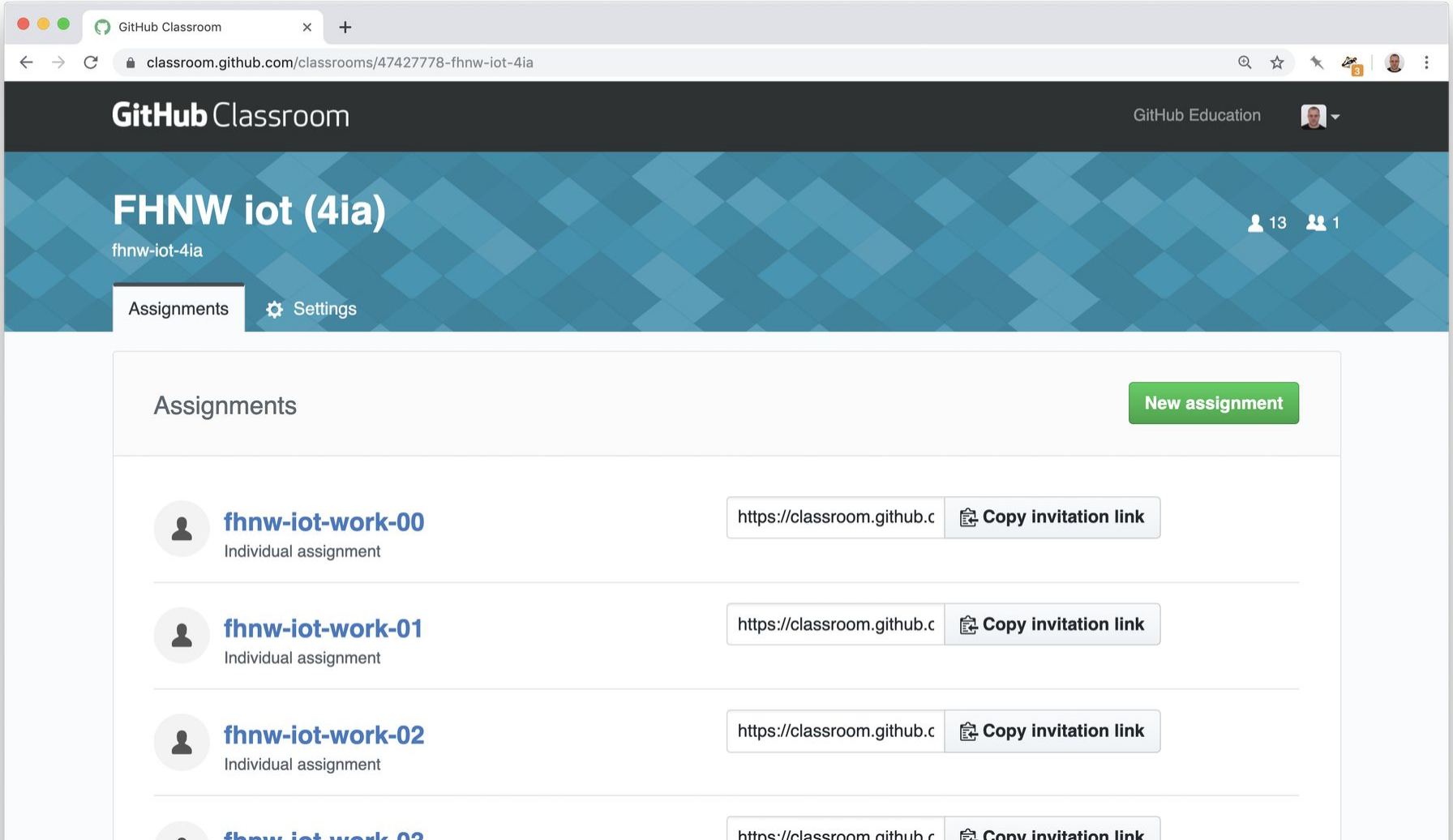
tamberg opened this issue on 19 Feb · 7 comments

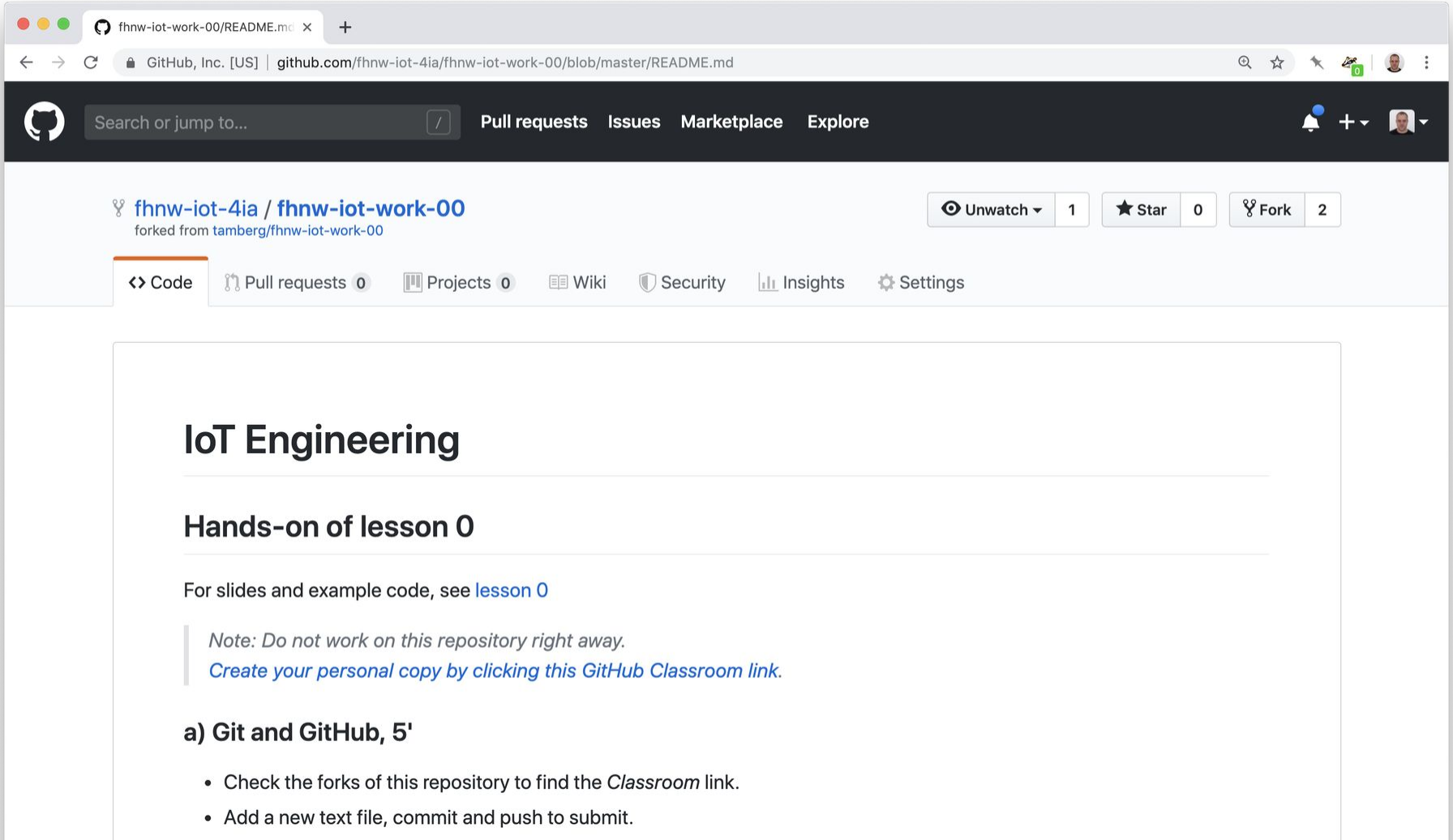
tamberg commented 26 days ago • edited Author Owner

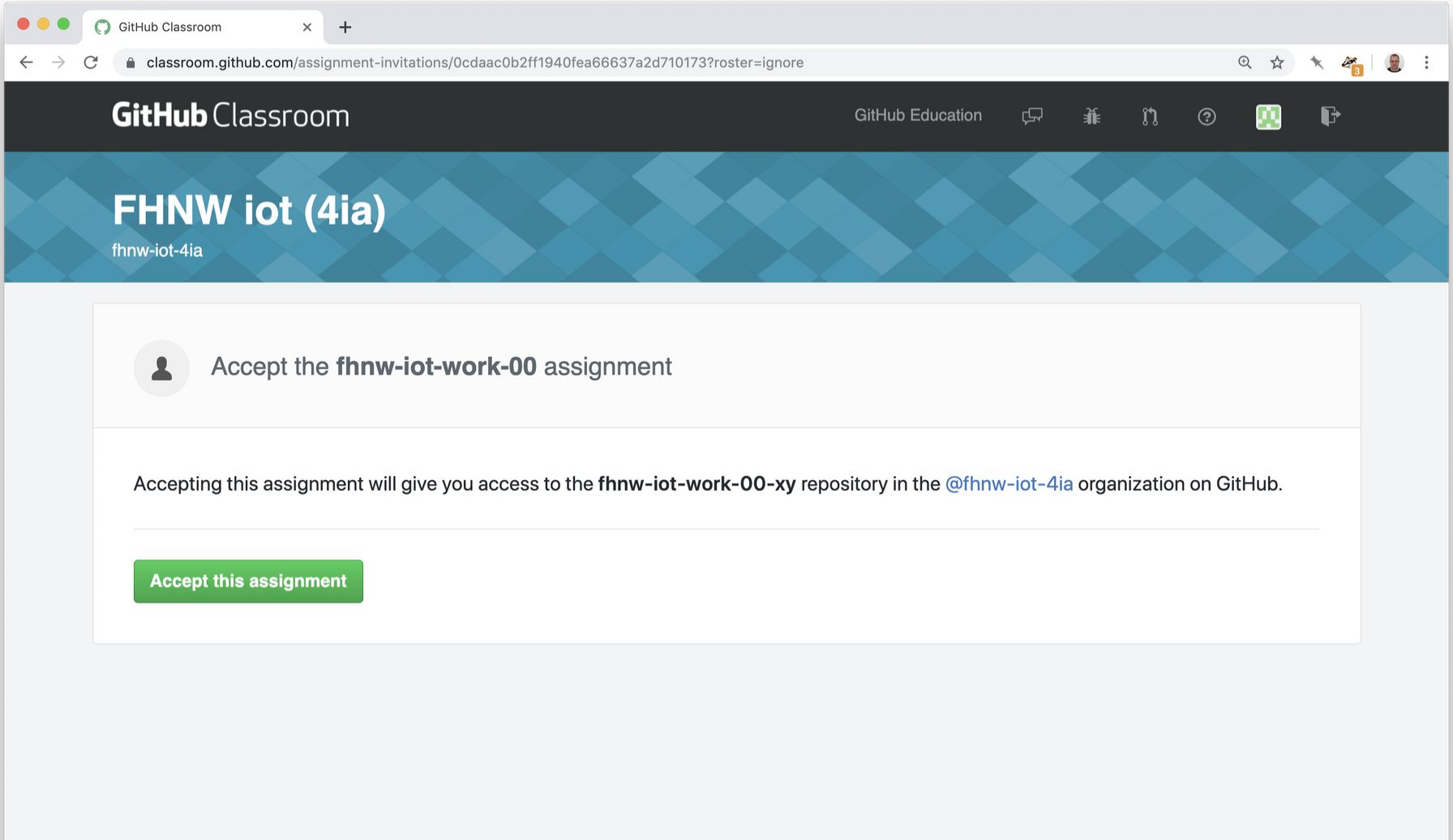
Here's a better fix, using a 100 kΩ resistor:

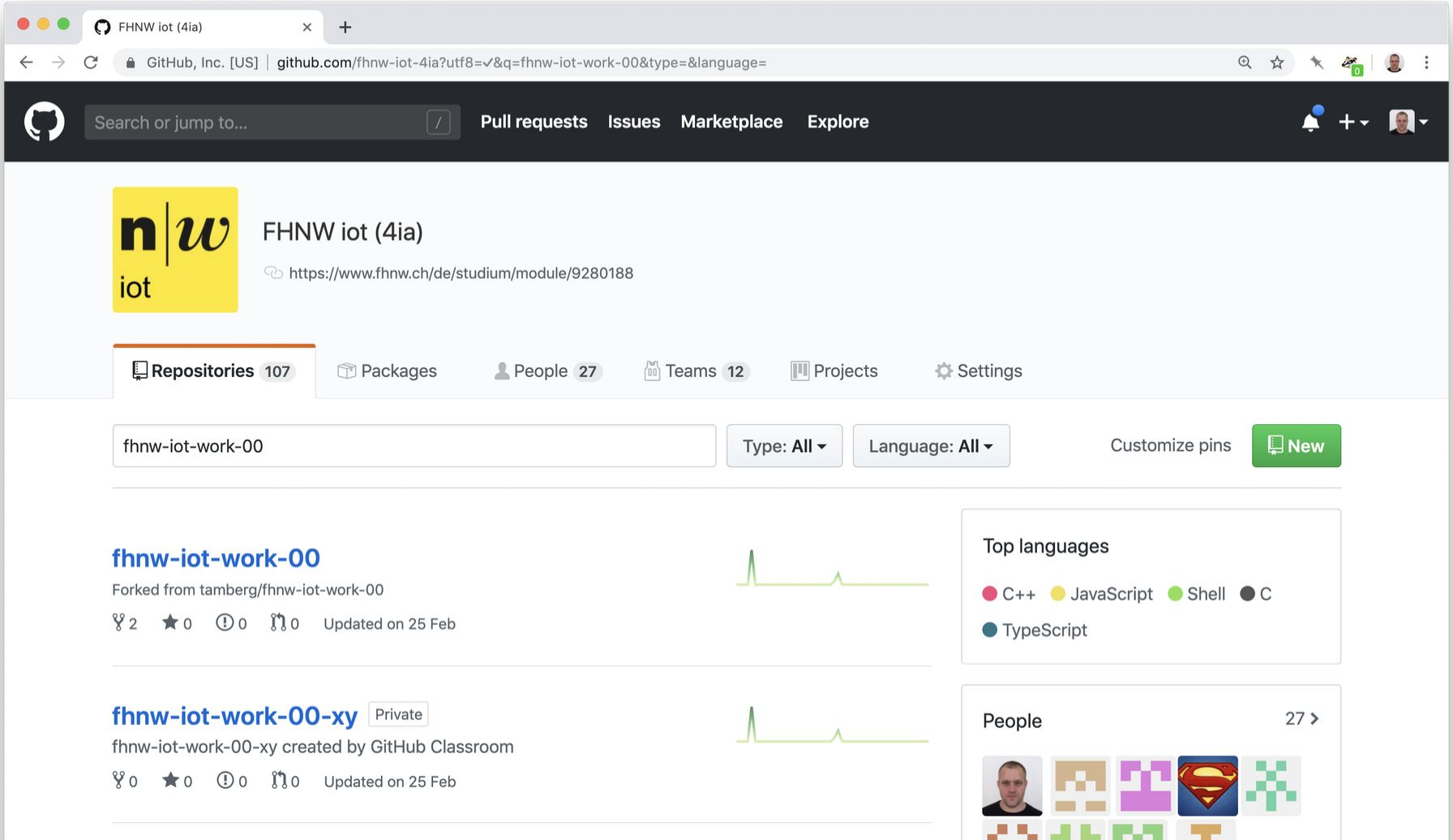



GitHub Classroom
classroom.github.com/classrooms
GitHub Classroom
GitHub Education
Search...
Sort by: Oldest first
New classroom
FHNW iot (4ia)
@fhnw-iot-4ia
13
1
LATEST ASSIGNMENTS
fhnw-iot-work-12
fhnw-iot-work-11
fhnw-iot-work-10
fhnw-iot-work-09
FHNW iot (5ibb1)
@fhnw-iot-5ibb1
0
0
Create your first assignment
with ♥ by GitHub
GitHub Classroom is open source.


GitHub Classroom
classroom.github.com/classrooms/47427778-fhnw-iot-4ia
GitHub Classroom
GitHub Education
FHNW iot (4ia)
fhnw-iot-4ia
13
1
Assignments
Settings
Assignments
New assignment
fhnw-iot-work-00
Individual assignment
https://classroom.github.c
Copy invitation link
fhnw-iot-work-01
Individual assignment
https://classroom.github.c
Copy invitation link
fhnw-iot-work-02
Individual assignment
https://classroom.github.c
Copy invitation link


fhnw-iot-work-00/README.md
GitHub, Inc. [US] | github.com/fhnw-iot-4ia/fhnw-iot-work-00/blob/master/README.md
Search or jump to...
Pull requests
Issues
Marketplace
Explore
fhnw-iot-4ia / fhnw-iot-work-00
forked from tamberg/fhnw-iot-work-00
Unwatch 1
Star 0
Fork 2
Code
Pull requests 0
Projects 0
Wiki
Security
Insights
Settings
IoT Engineering
Hands-on of lesson 0
For slides and example code, see lesson 0
Note: Do not work on this repository right away.
Create your personal copy by clicking this GitHub Classroom link.
a) Git and GitHub, 5'
Check the forks of this repository to find the Classroom link.
Add a new text file, commit and push to submit.


GitHub Classroom
classroom.github.com/assignment-invitations/0cdaac0b2ff1940fea66637a2d710173?roster=ignore
GitHub Classroom
GitHub Education
FHNW iot (4ia)
fhnw-iot-4ia
Accept the fhnw-iot-work-00 assignment
Accepting this assignment will give you access to the fhnw-iot-work-00-xy repository in the @fhnw-iot-4ia organization on GitHub.
Accept this assignment


FHNW iot (4ia)
GitHub, Inc. [US] | github.com/fhnw-iot-4ia?utf8=✓&q=fhnw-iot-work-00&type=&language=
Search or jump to...
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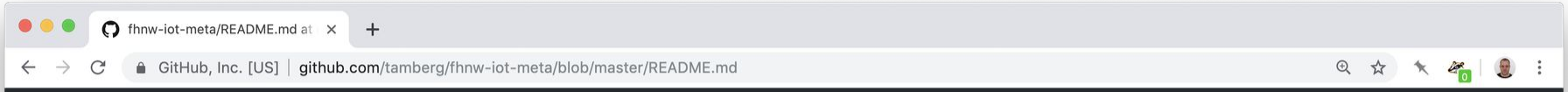
Explore
FHNW iot (4ia)
https://www.fhnw.ch/de/studium/module/9280188
Repositories 107
Packages
People 27
Teams 12
Projects
Settings
fhnw-iot-work-00
Type: All
Language: All
Customize pins
New
fhnw-iot-work-00
Forked from tamberg/fhnw-iot-work-00
2 0 0 0 Updated on 25 Feb
fhnw-iot-work-00-xy
Private
fhnw-iot-work-00-xy created by GitHub Classroom
0 0 0 0 Updated on 25 Feb
Top languages
C++ JavaScript Shell C
TypeScript
People
27 >



tamberg / fhnw-iot-meta

Unwatch 1 | Star 0 | Fork 0

Code | Issues 0 | Pull requests 0 | Actions | Projects 0 | Wiki | Security | Insights | Settings

FHNW (iot) Meta

GitHub Classroom

- https://classroom.github.com/classrooms
  - https://classroom.github.com/classrooms/42295693-fhnw-iot-4ia (per class)
    - https://classroom.github.com/classrooms/42295693-fhnw-iot-4ia/assignments/fhnw-iot-work-00 (assessment, per week)
    - https://classroom.github.com/classrooms/42295693-fhnw-iot-4ia/assignments/fhnw-iot-work-01
    - ...

GitHub Accounts