

i483 中間レポート(データまとめ)

計測環境

- 学生寄宿舍, 自室のデスクの隅 (あまりデスクライトが届いていない)
- 18:00から24:00頃

課題1

1.1

- RPR0521RSを使ったesp-idfによる計測
- センサ設定
- LED current 200mA
- Gain x64

```
79.015625 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.128906)
79.011719 lx (infrated: 14.128906)
79.011719 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.128906)
79.011719 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.128906)
79.011719 lx (infrated: 14.125000)
79.015625 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.128906)
79.011719 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.125000)
79.015625 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.128906)
79.011719 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.125000)
79.007812 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.128906)
79.011719 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.132812)
79.015625 lx (infrated: 14.128906)
79.011719 lx (infrated: 14.128906)
79.011719 lx (infrated: 14.128906)
```

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79.011719 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.125000)
79.015625 lx (infrated: 14.128906)
79.019531 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.132812)
79.015625 lx (infrated: 14.128906)
79.023438 lx (infrated: 14.128906)
79.023438 lx (infrated: 14.132812)
79.011719 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.128906)
79.011719 lx (infrated: 14.132812)
79.011719 lx (infrated: 14.128906)
79.011719 lx (infrated: 14.128906)
79.019531 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.125000)
79.011719 lx (infrated: 14.128906)
79.011719 lx (infrated: 14.125000)
79.019531 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.128906)
79.011719 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.128906)
79.011719 lx (infrated: 14.132812)
79.023438 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.128906)
79.011719 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.128906)
79.015625 lx (infrated: 14.132812)
79.011719 lx (infrated: 14.128906)
79.011719 lx (infrated: 14.128906)
79.011719 lx (infrated: 14.128906)
79.023438 lx (infrated: 14.128906)
79.019531 lx (infrated: 14.132812)
79.023438 lx (infrated: 14.128906)
```

1.2

- MicroPythonによるSCD41を使った計測
- センサ設定: デフォルト

```
1971 ppm, 22.40444 °C, 67.85229 RH
2143 ppm, 22.42847 °C, 68.82735 RH
2274 ppm, 22.30831 °C, 69.52773 RH
2381 ppm, 22.1748 °C, 70.15335 RH
2435 ppm, 22.04662 °C, 70.8629 RH
2471 ppm, 21.93179 °C, 71.45342 RH
2485 ppm, 21.82765 °C, 72.04242 RH
2493 ppm, 21.71282 °C, 72.59632 RH
2496 ppm, 21.63805 °C, 73.05562 RH
```

```
2502 ppm, 21.56062 °C, 73.52102 RH
2502 ppm, 21.50187 °C, 73.96811 RH
2504 ppm, 21.44846 °C, 74.37705 RH
2508 ppm, 21.36568 °C, 74.70512 RH
2510 ppm, 21.31495 °C, 75.02403 RH
2512 ppm, 21.26688 °C, 75.31396 RH
2514 ppm, 21.23217 °C, 75.52911 RH
2516 ppm, 21.20013 °C, 75.81903 RH
2531 ppm, 21.16274 °C, 76.02502 RH
2531 ppm, 21.13069 °C, 76.2005 RH
2532 ppm, 21.12268 °C, 76.36073 RH
2532 ppm, 21.10666 °C, 76.49195 RH
2535 ppm, 21.06393 °C, 76.59418 RH
2535 ppm, 21.06927 °C, 76.71168 RH
2539 ppm, 21.05859 °C, 76.7773 RH
2540 ppm, 21.07462 °C, 76.84901 RH
2540 ppm, 21.04524 °C, 76.90852 RH
2541 ppm, 21.05325 °C, 76.98177 RH
2541 ppm, 21.0666 °C, 77.02144 RH
2541 ppm, 21.06126 °C, 77.02296 RH
2542 ppm, 21.07195 °C, 77.06416 RH
2541 ppm, 21.07195 °C, 77.09621 RH
2540 ppm, 21.06393 °C, 77.08705 RH
2541 ppm, 21.0666 °C, 77.11757 RH
2541 ppm, 21.07195 °C, 77.08553 RH
2541 ppm, 21.07996 °C, 77.07332 RH
2542 ppm, 21.09331 °C, 77.0489 RH
2542 ppm, 21.09865 °C, 77.07942 RH
2545 ppm, 21.10666 °C, 77.04585 RH
2546 ppm, 21.12802 °C, 77.00008 RH
2547 ppm, 21.13336 °C, 76.95583 RH
2547 ppm, 21.14939 °C, 76.94209 RH
2547 ppm, 21.16007 °C, 76.96193 RH
2552 ppm, 21.17609 °C, 76.89479 RH
2552 ppm, 21.18143 °C, 76.87343 RH
```

1.3

2と兼ねる

課題2

実装

実装を行い、以下に述べるセンサ設定で計測を行った。

- 実装: `{repository_root}/esp32-sensing`
- 使用言語: Rust

- 利用したcrate
 - esp-idf-svc: esp-idfのラッパー/HAL
 - https://docs.esp-rs.org/esp-idf-svc/esp_idf_svc/index.html
 - byteorder: エンディアンの変換
 - <https://docs.rs/byteorder/latest/byteorder/>
 - anyhow: エラー処理, Result型の統一的な扱い
 - <https://docs.rs/anyhow/latest/anyhow/>

RPR0521RSの設定

- LED current: 200mA
- Gain x64

補完式がデータシートに提供されいなかったため, RohmのArduinoライブラリを参考にした
<https://github.com/RohmSemiconductor/Arduino/blob/447c576a4ff34215adaf2ae0e5ea68fbc4d73b8f/RPR-0521RS/RPR-0521RS.cpp#L182>

BH1750の設定

- One Time H-Resolution Mode2
- MTReg: 0xfe
 - one count = 0.11 lx

DPS310の設定

- coefficient source: external temperature sensor
- oversampling 64 times

デフォルトではASIC内部のセンサを用いるようになっていたが, 値がおかしい($-N^{\circ}\text{C}$ など)ので外部の温度センサを用いるように設定した

SCD41の設定

- デフォルト

計測

- 計測方法
 - `print_csv()` (esp32-sensing/main.rs 内)
 - シリアルモニタで保存したログからCSVを作った `picocom -g output.txt ...`
- データ: `{repository_root}/data/data.csv`
- 横軸: 計測回数





