Lab 3

Objectives:

- Become familiar with the Bleak Python Bluetooth Low Energy (BLE) library.
- Learn how to read/write data via using Bleak
- Introduction to the RF-ranging

Note: Please be gentle with the hardware. Do not save your lab scripts on the board.

Give: You must submit your code via *give* by the assessment date (which is the day of your lab in the following week) or you will receive a mark of 0. You may submit as many times as you wish. Your latest submission will override previous files.

Please finish the provided tutorials (5) before attempting to solve this exercise. Following a systematic approach will save you a lot of time and heartache.

Marking Criteria

Demonstration (8 marks) – Due next week.

Modify code templates in tutorial 5. You need to complete following tasks:

Task 1 (3 marks)

Use the Bleak Python library to demonstrate Tasks 2 and 3 in Lab 2.

Task 2 (5 marks)

2.1 Create a pathloss propagation model between your laptop and the Arduino board by 1) measuring the BLE packet Received Signal Strength Indicator (RSSI) in dBm over at least 10 different distances, 2) using NumPy's least squares equation [1] to estimate the unknown propagation model parameters. (2 marks)

2.2 Print out the range between your laptop and the Arduino board by using the propagation model to find range from the RSSI of a BLE packet sent from the Arduino board that in an arbitrary distance away from the laptop. (2 mark2)

2.3 Use the matplotlib to plot the collected data (RSSI/distance) from 2.1 and fitted line. (1 mark)

Reference

[1] https://numpy.org/doc/stable/reference/generated/numpy.linalg.lstsq.html