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https://github.com/davizjc/Embedded-System-Lab-Hw4.git
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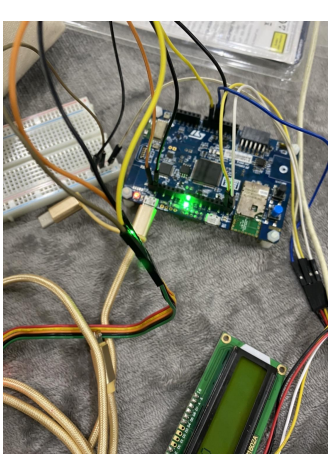
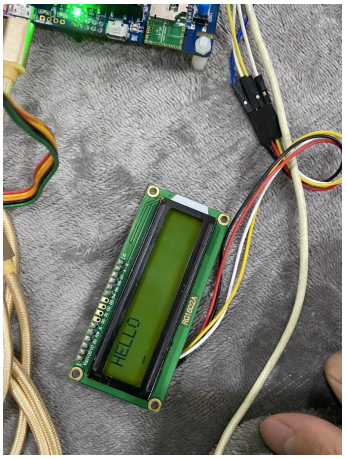
Homework 4 Serial RPC and WiFi MQTT

1. eRPC
    - At first I was having trouble understanding ERPC and how it works so how I implement this homework is from rewriting lab 9.1.
    - How I set up this lab is that I was using one of the XBee (usbserial-AC00CJUO) plug into my pc and another XBee connected to the mbed board and to my pc. Since there are two grounds in the mbed one will be used to connect i2c text and the other one for the xbee. For VCC, I use a circuit board to connect both xbee and i2c to 5v. D0 will be connected to RX (yellow cable) and D1 to Tx (orange) (if I use the no-word cable on top). For i2c, SCL will be D15 and SDA will be D14.
    - In my main is basically similar to lab 9 by first initialize the RPC server, connect to it and call the service, in my code i use “rpc_server.addService(&led_service);” because I doesn’t want to change the name from lab 9 because it work. After this just run the rpc server. if nothing goes wrong it will say Running server in the serial monitor. I also have void location and print text . These two functions basically locate the cursor like where it starts and print text just print hello.
    - Since we want to generate the shim code for ERPC. we need to first declare the function in led-service.erpc (I just use this name because I don’t want to change other things) . In this file I have to function printtext(in uint8 led) -> void and location(in uint8 led) -> void. Then in the terminal uses “~/Downloads/erpcgen led-service.erpc " to generate 4 files, we delete the client.cpp one cause we don’t need it.
    - For the client side(python) I named it led_test.client.py (because I just want to copy the command from the lab9 and it works anyway). I also generate erpc for the python file too. Using “ ~/Downloads/erpcgen led-service.erpc”
    - From there use client.location(1) to call function in mbed and print("LCD locate") and use to call client.printtext(1) and print("LCD print") in python
    -
    -

```
Initializing server.
Adding LED server.
Running server.
LCD print
LCD locate
```





2. MQTT through WiFi to transfer
    a. For this homework we only need the mbed board and our pc
    b. 3 library will be added and use
        i. Import ISM43362 library for MQTT part
        ii. Import MQTT library for MQTT part
        iii. BSP library for yaw,roll,pitch
    c. Command needed are
        i. python3 mqtt_client.py (to run python run in /Mbed Programs/ hw4.2/)
        ii. /usr/local/opt/mosquitto/sbin/mosquitto -c ~/Mbed\ Programs/mosquitto.conf
            1. To run mosquitto (run in from the root directory)
    d. I implement the program so that it will connect to SSID, then connect to TCP network…, then IP ADD, and Port. If everything works properly then Successfully connected! Will be printed. I use two threads in the program, one for roll, pitch, and yaw. And the other one for sending the message to the python program. When the button falls it will start recording, I didn't know when it will stop recording so it will record forever. When the button is raised it will trigger publish message and send the roll, pitch, and yaw to mqtt and it will print. If either of the angle is bigger than 10 it will print a publish message and the three values , the python will reply back with the value. Else the program will print the degree is less than 10 and the python won't be replying back.

```
Connecting to Davis...
Connecting to TCP network...
address is 172.20.10.2/1883
Successfully connected!
```

if everything work properly

```
Connecting to Davis...
Connecting to TCP network...
address is 172.20.10.2/1883
Successfully connected!
Puslish message: -51.594470/39.317543/-0.364951

python reply -51.594470/39.317543/-0.364951
```

The button is press when the degree is more than 10 so it was send to the python and it reply

```
Birds-MacBook-Pro:hw4.2 birdhsieh$ python3 mqtt_client.py
Connecting to 172.20.10.2/Mbed
Connected rc: 0
Subscribed OK
[Received] Topic: Mbed, Message:  b'start receiving!\n'
[Received] Topic: Mbed, Message:  b'-51.594470/39.317543/-0.364951\n\x00'
```

when i run the python program and it connect, this is after it receive the first message sended

```
Successfully connected!
Puslish message: -51.594470/39.317543/-0.364951

python reply -51.594470/39.317543/-0.364951

the degree is less than 10
Puslish message: -56.849608/40.608744/-43.655472

Puslish message: -56.849608/40.608744/-43.655472

Puslish message: -56.849608/40.608744/-43.655472

Puslish message: -56.849608/40.608744/-43.655472

Puslish message: -47.845268/36.493246/-43.959436
```

This is when the degree is less than 10 it won't reply back

```
Subscribed OK
[Received] Topic: Mbed, Message:  b'start receiving!\n'
[Received] Topic: Mbed, Message:  b'-51.594470/39.317543/-0.364951\n\x00'
[Received] Topic: Mbed, Message:  b'\\4\x00'
[Received] Topic: Mbed, Message:  b'-56.849608/40.608744/-43.655472\n\x00'
[Received] Topic: Mbed, Message:  b'-56.849608/40.608744/-43.655472\n\x00'
[Received] Topic: Mbed, Message:  b'-56.849608/40.608744/-43.655472\n\x00'
[Received] Topic: Mbed, Message:  b'-56.849608/40.608744/-43.655472\n\x00'
[Received] Topic: Mbed, Message:  b'-47.845268/36.493246/-43.959436\n\x00'
```

It did receive a signal but then it won't print out the number