

Rick Brophy
ECE1188 – Cyberphys
Dr. Dickerson
Due: 4/15/24

Lab 6:

1. Weather Terminal Screenshots

```
Fetching weather from openweathermap.org
Starting configureSimpleLinkToDefaultState(); ... Completed
Starting sl_Start(0, 0, 0); ... Completed
Starting establishConnectionWithAPC(); ... Connected
Starting sl_NetAppDnsGetHostByName(api.openweathermap.org) ... Completed
Creating a socket ... Completed
Connecting to this socket ... Completed
Sending this TCP payload to socket
GET /data/2.5/weather?q=Pittsburgh&APPID=e17b61fe731845e665335d442ea7e84e&units=imperial HTTP/1.1
Host: api.openweathermap.org
Accept: */*

Received this response from server
HTTP/1.1 200 OK

Server: openresty

Date: Thu, 11 Apr 2024 18:20:52 GMT

Content-Type: application/json; charset=utf-8

Content-Length: 560

Connection: keep-alive

X-Cache-Key: /data/2.5/weather?APPID=e17b61fe731845e665335d442ea7e84e&q=pittsburgh&units=imperial

Access-Control-Allow-Origin: *

Access-Control-Allow-Credentials: true

Access-Control-Allow-Methods: GET, POST

{"coord":{"lon":-79.9959,"lat":40.4406},"weather":[{"id":502,"main":"Rain","description":"heavy intensity rain","icon":"10d"},
{"id":701,"main":"Mist","description":"mist","icon":"50d"}],"base":"stations","main":
{"temp":61.9,"feels_like":62.2,"temp_min":59.77,"temp_max":64.15,"pressure":1000,"humidity":94},"visibility":2816,"wind":{"speed":5.75,"deg":120},"rain":{"1h":5.91},"clouds":
{"all":100},"dt":1712859419,"sys":{"type":2,"id":2008550,"country":"US","sunrise":1712832403,"sunset":1712879675},"timezone":-14400,"id":5206379,"name":"Pittsburgh","cod":200}
Push LaunchPad switch to run again
```

Google weather

All News Images Videos Shopping : More Tools

About 5,990,000,000 results (0.35 seconds)

Results for **Pittsburgh, PA 15213** [Use precise location](#)

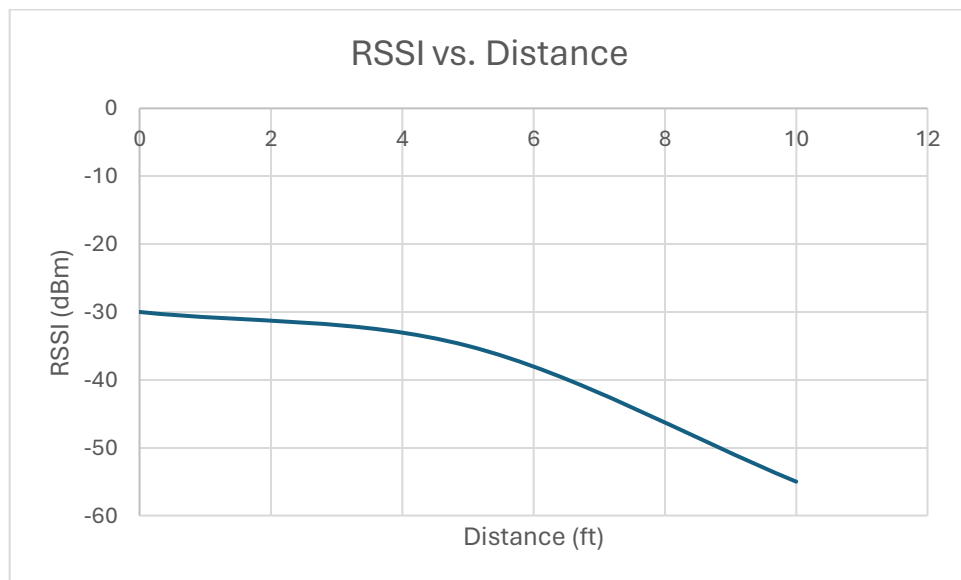
63 °F | °C Precipitation: 74% Humidity: 83% Wind: 7 mph

Weather
Thursday 2:00 PM
Rain

Temperature | Precipitation | Wind

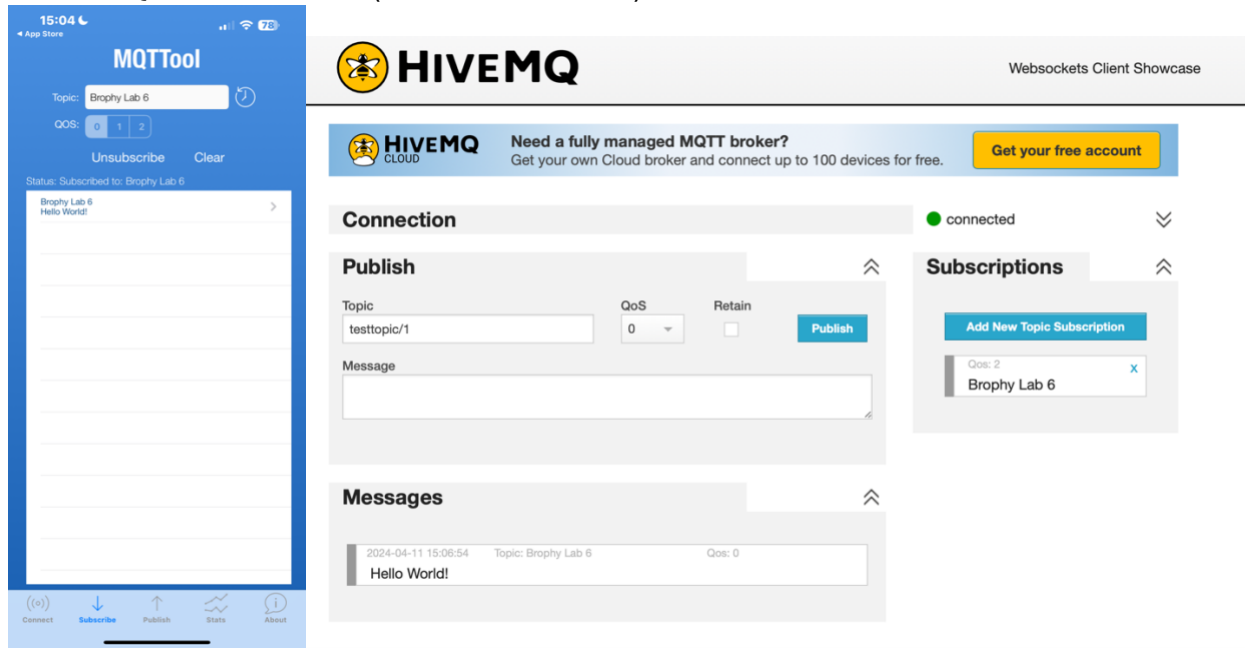
2. RSSI Screenshots

```
{ "coord": { "lon": -79.9959, "lat": 40.4406 }, "weather":  
[ { "id": 804, "main": "Clouds", "description": "overcast  
clouds", "icon": "04d" } ], "base": "stations", "main":  
{ "temp": 61.81, "feels_like": 62.2, "temp_min": 59.27, "temp_max": 66.22, "pressure": 1016, "humidity": 96  
, "visibility": 10000, "wind": { "speed": 1.01, "deg": 112, "gust": 3 }, "clouds":  
{ "all": 100 }, "dt": 1712870437, "sys":  
{ "type": 2, "id": 2008550, "country": "US", "sunrise": 1712832403, "sunset": 1712879675 }, "timezone": -144  
00, "id": 5206379, "name": "Pittsburgh", "cod": 200 }  
  
RSSI: -45 dBm  
RSSI: ~0.100000 uW  
Sorry pow() doesnt give much precision:(  
Push LaunchPad switch to run again  
  
usbmodemM43210051 (Texas Instruments) / 115200 8-N-1  
Connected 00:11:32, 129,189 / 0 bytes  
  
TX RTS DTR DCD  
RX CTS DSR RI
```



Friis equations denotes that power received is inversely related to the square of distance. Hence, there is a quadratic relationship between distance and RSSI.

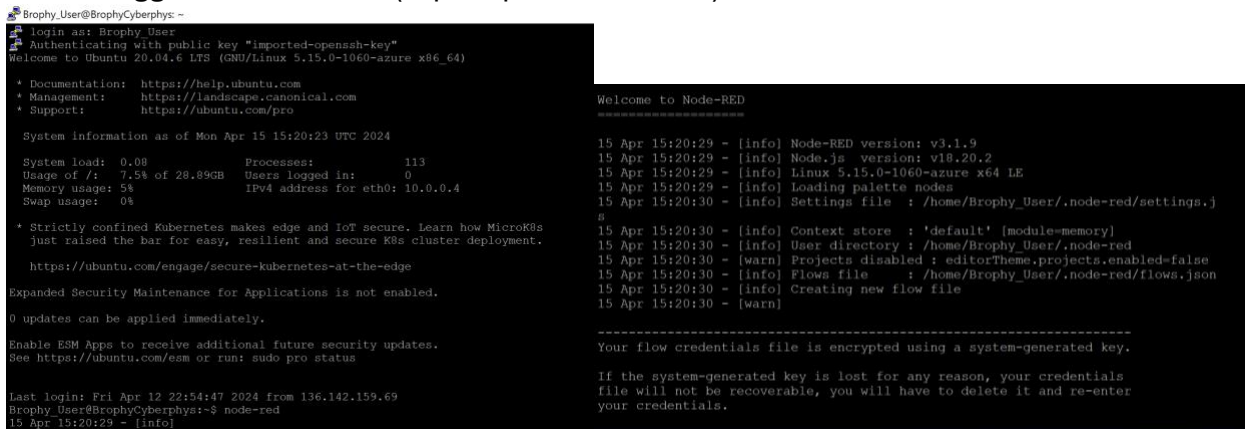
3. MQTT Screenshots (2 different devices)



4. Controlling the motor using MQTT:

<https://youtube.com/shorts/l2E02x1tLHQ?si=kvuTCDSjxhw9m46F>

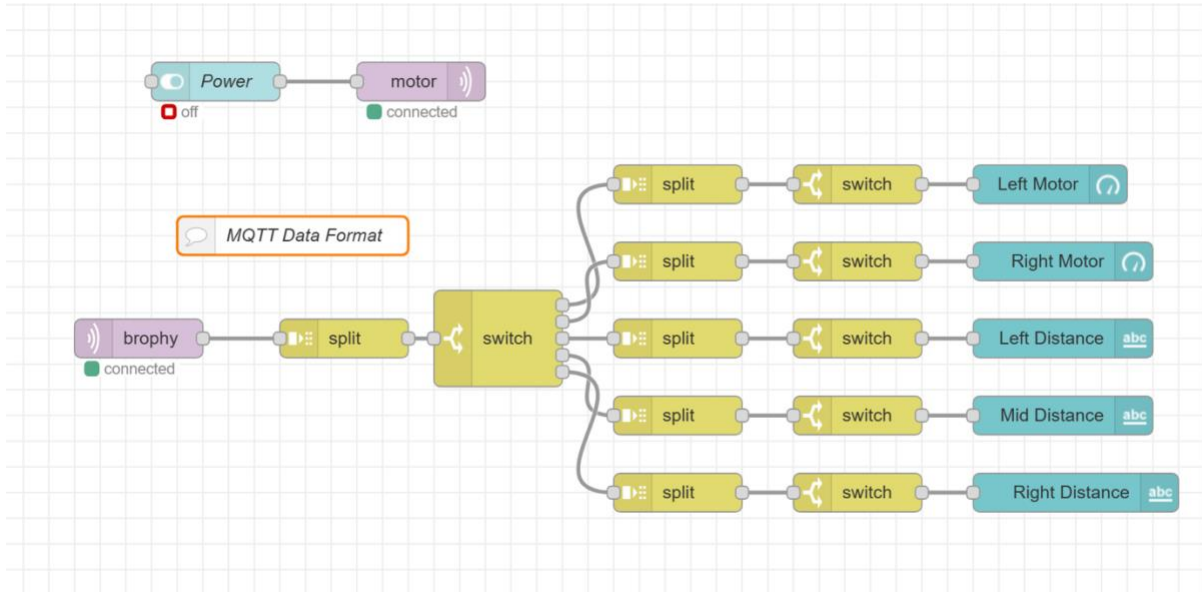
5. Logged into node red (I split up to view better)



6. Node Red running on server

a. Web links (not sure how you are supposed to access this so I will have ss)

- i. <http://172.187.229.243:1880/>
- ii. <http://172.187.229.243:1880/ui>



This is my flow for node red, I used the “split” and “switch” node to parse through 1 MQTT command (1 publish topic for the robot). Unsure if this was the correct way to do this because the web app became very slow when updating all 5 values: 2 RPM and 3 distances values. The first split node uses “,” to separate different data (Left RPM, Right RPM, 3 distances). The switch case places each line appropriately then the next split & switch nodes together can extract the numerical value. This value is then placed into either the gauges (RPM) or text field (distances).

Motor Power



Motor RPM

Left Motor



Right Motor



Distance Sensor

Left Distance

mm

Mid Distance

mm

Right Distance

mm

Unfortunately, I was unable to get everything working together as you'll see in the videos below. I can easily start and stop the motor with the switch button, but it does not work when also updating the RPM values. I could not get the distance sensor to work at all, and sometimes the sensor would somehow disable the robot from successfully connecting to the MQTT Broker. Very odd. But, when transmitting the data in the correct form from my phone, I am able to update all 5 values (this is the last video to prove my flow would work with correct code). I have 3 node red videos uploaded.

Video 1 (Motor start/stop via website):

https://youtu.be/Vam2VUUD-ZU?si=sxpQiRr_5capgxMk

Video 2 (Motor RPM uploaded via robot):

<https://youtu.be/Qe1rEoBmJwo?si=E1FAJT8roSmqbjSG>

Video 3 (All values uploaded via MQTTTool):

<https://youtube.com/shorts/dUO7wqhY0EI?si=eSjUpYAoo4v8pEJy>