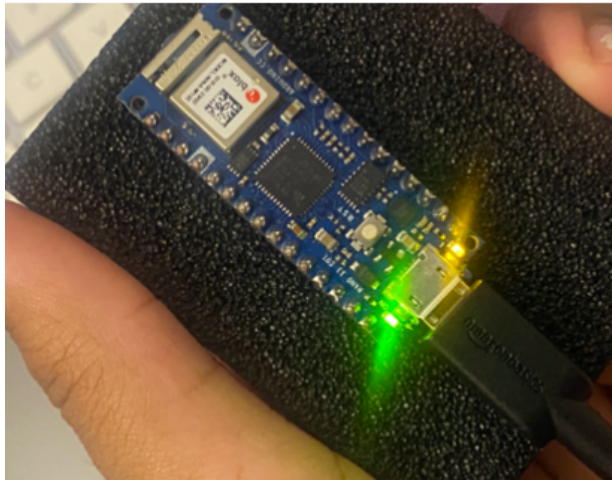Lab 4 - Katarina Martinez

Task 1:


```
34        Serial.println("X\tY\tZ");
35     }
36
37     void loop() {
38        float x, y, z;
39
40        if (IMU.accelerationAvailable()) {
41          IMU.readAcceleration(x, y, z);
42
43          Serial.print(x);
44          Serial.print('\t');
45          Serial.print(y);
46          Serial.print('\t');
47          Serial.println(z);
48        }
49     }
```

Output   Serial Monitor ✕

Not connected. Select a board and a port to connect automatically.

```
0.47      0.12      0.80
0.59      0.12      0.81
0.69      0.21      0.82
0.59      0.24      0.81
0.61      0.21      0.79
0.60      0.21      0.79
0.59      0.23      0.79
0.60      0.24      0.80
0.61      0.21      0.82
0.60      0.16      0.82
0.58      0.14      0.80
0.58      0.14      0.79
```

Task 2:

```
Connecting to UCLA_WIFI

WiFi connected
IP address:
172.30.77.177
```

Task 3:

```
    "GYR_Z": -0.122070313
  }
  {
    "ACC_X": -3.761290789,
    "ACC_Y": -2.477998734,
    "ACC_Z": 8.743624687,
    "GYR_X": -3.845214844,
    "GYR_Y": -1.586914063,
    "GYR_Z": 0.061035156
  }
```

The IMU records data every 0.5 seconds, without adjusting the code. In order to reduce the lag, we can change the IMU's sampling rate which will implement filtering algorithms to send messages with more time in between each message. We can optimize the network infrastructure for low-latency communication which will ensure reliable connection. Sufficient bandwidth, and minimal congestion. A button would be useful, so that only one message is sent. We want to implement a button into our game for our IMU.

Task 4:

```
--------------------------------
Direction:    X          Y          Z
ACC Data: -0.002394, -0.065841, 9.816227
--------------------------------
GYR Data: 0.427246, 0.183105, 0.122070
```

When the IMU is inactive, there is little to no motion that is detected by the sensors, and accelerometers would read close to zero acceleration in all axes indicating there is no big movement. I was able to find the x, y, and z directions and confirm that the IMU was recording the data. The gravity acceleration is 9.816227 which is accurate to real gravity acceleration when the IMU is lying in the z-direction. Overall, the IMU is accurate for determining various movements. The values drift with larger position differences, but not when the IMU is still.