**Lab 5**

**IoT Portals**

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April 20, 2022

**Part 1.2**

Text

Description automatically generated

Text

Description automatically generated

Graphical user interface

Description automatically generated

**Part 1.3**

This program is from Lab4 Part 5, with Publish functionality added, as shown below.

On 30s intervals, regardless of menu usage, the program will upload the data to ThingSpeak Channel.

Text

Description automatically generated

Text

Description automatically generatedText

Description automatically generated

**ThingSpeak Published Data:**

Graphical user interface

Description automatically generated

**Part 2**

Text

Description automatically generated

Chart, line chart

Description automatically generated

**\*\*Please see attached file for code\*\***

**Critical Reflection**

Where do I even start with this one? This lab was a real test of fortitude for me. I will start with my problems and finish with my learning this time.

The first steps of the lab; setting up ThingSpeak and understanding the Channel/Publish process were very straightforward. I even had initial success with using the Publish Sample that was provided. Trying to add the function to my sensor/display program proved to be a much larger challenge. I created a new channel, copied the code/keys over and expected to be amazed at my own brilliance(now known as **hubris**). It was unsuccessful. As were the next fifty or so variations of callback function movements, loop changes, variable changes, API keys refreshed, new channel names and finally a debug statement added to see if I could even get values to variables in the function I built. I was getting values; everything was being set to the correct parameters and syntax. Still no successful publishing; but I was undeterred. I searched high-and-low online for an answer, but I couldn’t find anything. With no other option(should have been my first step) I reached out to Lubos, and he informed me of a change to the API that now requires different syntax to publish on ThingSpeak(only sometimes). This also required the creation of a device on ThingSpeak with a unique generated ID, Username and Password. With this additional step, and the correct values and syntax; I finally vanquished the Publishing function that should have only taken an hour. The rest of the lab went smoothly, thanks to the abundance of Student Resources provided.

I learned several things throughout this lab. Each of the IoT portals studied had something uniquely valuable to offer, and with so many choices in providers some research into applicability of services is very important for consumers and developers. Azure provides(for a cost) a very broad range of resources for their IoT systems, and they function well within the rest of the Microsoft Ecosystem. Portals such as ThingSpeak offer more limited resources for smaller applications and educational purposes. I have learned that Cloud services match IoT systems very well for a couple reasons, they are easy scalable and have relatively cheap cost per unit; this makes them an excellent match for Industrial IoT applications. Most importantly, I also learned to ask Lubos more questions; it would have saved nearly 10 hours of painful failures.