

sdmay19-47: NSF Lab furnace control system

Week 10 Report

November 25th- December 2nd

Team MembersAdam Matthews — *Software/Hardware Engineer, Report Manager*Kevin Lang — *Electrical Engineer*Jeremy Hartl — *Hardware Engineer*Christopher Pohlen — *Software Engineer/Gitlab Moderator*Nick Brylski — *Systems Engineer***Advisor/Client**Dr. Gary Tuttle

Summary of Progress this Report

In this status report we worked on adding an analog read function into the arduino mega's Code. This includes parsing a character from the GUI, 'R', and then using the analogRead function on the arduino to read the analog pins values, 10bit values from 0 to 1023. We are communicating via serial so to transmit this data back we must convert to string. Formatting is also important for consistency. We want to send back 4 characters every time so 0 is really sent as 0000, similar to the OTC. This is done through some nifty formatting of the sprintf function as seen below.

```
printf(buf, "%04d%04d%04d%04d%04d%04d%04d", reads[0], reads[1], reads[2], reads[3], reads[4], reads[5], reads[6], reads[7])
```

This buffer is then sent back to the GUI using serial.write, 32 bytes in total. This was tested by simply jumping the analog pins to 3.3/5v and ground pins to see if they were being read correctly. This was found to be true so it works.

The API was turned into a importable python module. This is done because we need to be able to easily export function into the GUI. Before the API was not a module, it was a self contained script/ testing function.

Pending Issues

Our client, Dr. Tuttle, is still working on determining what kind of mass-flow controllers we will be using. We have begun investigating connectors for the MFCs and our planning on buying some next semester to begin testing the system on a real mass flow controller. So far our results have been tested on multimeters which is not the real thing. We also need to find connectors for the OTC controller.

The GUI still needs a large amount of work done, we are still learning how to create a GUI with the Tkinter library as it is not simple task.

The client has also specified that he would like some redundant displays readouts, so if the computer running the GUI were to fail the values of the readouts could still be seen.

Plans for Upcoming Semester

We will be doing some perfboarding with our system before ordering a PCB to make sure everything is communicating correctly. We will also be trying to solve the pending issues above. Overall there is a considerable amount of work to do to make sure our solution is implemented successfully.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Adam Matthews	<ul style="list-style-type: none">Modified API	8	60
Kevin Lang	<ul style="list-style-type: none">Worked on analog read function	8	38
Jeremy Hartl	<ul style="list-style-type: none">Helped make demo videos	8	50
Christopher Pohlen	<ul style="list-style-type: none">Worked with api modification	8	46
Nick Brylski	<ul style="list-style-type: none">Added analog read function and parsing to arduino mega	8	65

Gitlab Activity Summary

Nothing to report.
