EE/CprE/SE 491 WEEKLY REPORT 3
Feb 14, 2022 – Feb 20, 2022

Group number: *12*

Project title: *Creating DNA from scratch for DNA-based data storage*

Client &/Advisor: *Iowa State University / Meng Lu*

Team Members/Role: *Connor Larson/Software Engineer , Kyle Riggs/Software Engineer , Brandon Stark/Electrical Engineer , Nathan Armstrong/Electrical Engineer , & Lucas Heimer/Electrical Engineer*

- **Weekly Summary**

This week we put an emphasis on completing research for the LCD screen and the connections necessary for it to interface with the computer. We disassembled the 3D printer and removed the LCD screen to try to trace the ports back to the pins on the microcontroller. We conducted research to find more information on the LCD screen's IC as well as the IC for the overall printer. We also conducted research regarding the connections that can be made between the printer and computer as it is currently configured and if we are able to configure other connections between the two. Other alternative screens involving the use of a Raspberry Pi have also been reviewed as secondary options to the original screen.

- **Past week accomplishments**

• Team Member 1 (Connor): I worked on gathering resources and learning more about the Photon 3D printer. I was able to learn about the hard drive format and specifications needed to print from a flash drive. I also learned that you are unable to connect your computer to the printer through the USB port. I found some software that allows you to customize the 'User Interface' of the printer, but it doesn't seem to be of help. Finally, I was able to see the basic configuration file for the printer's settings.

• Team Member 2 (Kyle): This week we got access to the lab and were able to hands on see the printer and start researching what we are specifically working with. Because we cannot connect through our computers through USB, using a flash drive may be the best option. Also, we talked about the programming of LCD screens, so I did some research into Raspberry Pis because they may also be the best option we have for that.

• Team Member 3 (Brandon): Disassembled and looked into the 3D printer and its components. Found the name for the microcontroller and two other chips included on the main circuit board. Researched what can be done to the main LCD screen in terms of manipulation. Found a useful article regarding the use of a Raspberry Pi for future use.

• Team Member 4 (Nathan): We took apart the 3D printer to look at the circuitry and wiring inside. Our main focus was the LCD screen and how signals are communicated with it, then determining whether or not we could use it for our project. Outside of hands-on disassembly, I also brainstormed various ideas for what other ways we could use a live

script to send to the printer to print what we want. Also looked at the alternative raspberry pi LCD we were sent in Slack.

• Team Member 5 (Lucas): After getting access to the lab and 3D printer I worked on the disassembly of the 3D printer so we were able to analyze the components. I did some research into the microcontrollers on the board to determine if any of the functions will be useful for controlling the current LCD screen. I tried tracing the pins of the microcontroller to the LCD pins, but we currently have limited access to the datasheets for both components making it hard to determine what functional pins we would need to configure to program the screen.

- **Pending issues**

  • Team Member 2 (Kyle): Like Connor mentioned, the biggest roadblock we got was finding out a computer cannot just connect easily to the printer we were given. So, more research is being done to figure out the best way to handle it.

  • Team Member 3 (Brandon): We might need to look into using a Raspberry Pie for LCD screen manipulation and communication for our computers. I am not that familiar with the Raspberry Pi's so it is something I need to research and get familiar with.

  • Team Member 4 (Nathan): General brainstorming for various solutions. Still not entirely clear on what we are exactly going to do. So far, a lot of work has been trying to piece together all the different components of the project so we get one fluent plan.

  • Team Member 5 (Lucas): One of our main concerns is whether or not we can successfully program the current LCD screen or have the means to make the connections necessary. We will continue to research potential solutions to this issue as well as alternative components which include using a Raspberry Pi. We also need to gain a better understanding of how much of the 3D printer's functionality needs to be preserved for our final system.

- **Individual contributions**

NAME	**Individual Contributions** *(Quick list of contributions. This should be short.)*	**Hours this week**	**HOURS cumulative**
Member 1 (Connor)	Research potential options to connect to the printer, become more familiar with the printer.	6	18
Member 2 (Kyle)	Researched about the printer and Raspberry Pis for LCD programming.	6	18
Member 3 (Brandon)	Disassembled the 3D printer and researched potential use for Raspberry Pi and computer communication within the LCD.	6	18
Member 4 (Nathan)	Took apart the 3D printer, researched the microcontrollers found in the printer and different LCD's	6	18

Member 5 (Lucas)	Disassembled the 3D printer and researched about the microcontroller/LCD screen pin configurations	6	18

- **<u>Comments and extended discussion</u>** *(Optional)*
  Feel free to discuss non-technical issues related to your project.

- **<u>Plans for the upcoming week</u>** *(Please describe duties for the upcoming week for each member. What is(are) the task(s)?, Who will contribute to it? Be as concise as possible.)*
  - Team Member 1 (Connor): I want to carry on my goal from last week to try and establish some sort of connection to the printer. Specifically, I want to be able to display an image to the LCD display on the printer.
  - Team Member 2 (Kyle): I plan on talking to our advisor about the Raspberry Pi more and maybe looking into Python code, because that is likely needed for it.
  - Team Member 3 (Brandon): More than likely we will have to use the Raspberry Pi for LCD to computer communication, so I am going to get familiar with those connections and how everything will work.
  - Team Member 4 (Nathan): Continue researching different LCD's we can use, as well as troubleshooting connection issues with current LCD.
  - Team Member 5 (Lucas): I want to come to a consensus on the LCD screen we will be using and get the necessary components ordered for making the connection between the screen and computer

- **<u>Summary of weekly advisor meeting</u>** (*If applicable/optional)*
  (Provide a concise summary on the contents and progress made during the advisor meeting.)

During our weekly meeting we discussed what we currently have looked at, which at the time was the printer and taking it apart. He discussed potential options for connecting to it and potential problems we may run into. The current LCD we are using may not be able to connect the way we want, so we may have to look into buying a new one. Also, we talked about the hardware, so afterwards we were able to dismantle and analyze the parts of the printer. This was a short weekly meeting due to our mentor having a faculty meeting.