EE/CprE/SE 492 BIWEEKLY REPORT #1

Sep 5th 2022 – Sep 16th 2022

Group number: SDDEC22-12

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

Client &/Advisor: 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

o **Weekly Summary**

This week the team looked into new systems that need to be added to our design. These systems include a light we may control with Arduino, an interface that generates cells, and putting all of our parts together.

o **Past week accomplishments**

• Team Member 1 (Connor): This week I looked into Arduino IDE and how it can be communicated/controlled through our user interface which is written in C#. I learned that Arduino is coded in C# and that you can have C# interact with arduino via code and hardware.

• Team Member 2 (Kyle): Started to research and a little implementation of a Cell object in our DNA microarray so that the user would be able to customize each cell of the grid to get the exact DNA sequence they want.

• Team Member 3 (Brandon): Studied how to use Fusion 360 and get familiar with its software. Researched our LED component.

• Team Member 4 (Nathan): I planned and thought of design ideas with Brandon, and how we could implement everything together.

• Team Member 5 (Lucas): This week I worked on improving the overall performance of the microfluidic system. I worked through several possible shortcomings that are currently making the system slow and inefficient and outlined ideas for correcting them.

o **Pending issues**

• Team Member 1 (Connor): None

• Team Member 2 (Kyle): Just working through some bugs in the code as well as trying to find the best (ie: cleanest and most efficient) method of doing it.

• Team Member 3 (Brandon): Determine height needed for LCD above LED. Print housing.

• Team Member 4 (Nathan): Designing the housing for everything in Fusion360

• Team Member 5 (Lucas): The microfluidic system is relatively slow for the rate at which we

are expecting to run the DNA synthesis process. Improvements will need to be made to make it function within the expected parameters of our design.

- ○ **Individual contributions**

NAME	Individual Contributions	Hours this week	HOURS cumulative
Member 1 (Connor)	Performed research and did local tests to see if C# can interact with the Arduino IDE	6	6
Member 2 (Kyle)	Did some research on C# methods of want I want to accomplish as well as some minor implementation and testing.	6	6
Member 3 (Brandon)	3D modeled LED housing, researched potential LED control systems	6	6
Member 4 (Nathan)	Used Fusion360 to model the housing	6	6
Member 5 (Lucas)	Outlined solutions for improving the microfluidic system. Researched the concepts behind DNA synthesis and what our requirements will be.	6	6

- ○ **Plans for the upcoming week**
  - Team Member 1 (Connor): Start to create some methods/code within Arduino IDE which will be helpful in the future.
  - Team Member 2 (Kyle): Continue working on the Cell object being customizable and having a unique grid to print.
  - Team Member 3 (Brandon): Continue to model and print LED housing and order Arduino Nano for the LED control system.
  - Team Member 4 (Nathan): Continue to work on the housing in Fusion360
  - Team Member 5 (Lucas): I plan to continue testing the microfluidic system and collect data to serve as a reference for making overall improvements. Order some new tubing to help increase the flow rate for certain steps of the process.

- ○ **Summary of weekly advisor meeting**

  We decided what route we are going to go for the LED control system. We need to determine if we have a usable Arduino or order a new one. We also discussed some of the steps we will be going through to run the microfluidic system and how to integrate them into our design.