EE/CprE/SE 491 WEEKLY REPORT sdmay25-29

October 25, 2024 - October 31, 2024

Group number: 29
Project title: Implementation of the ABC using modern technology
Client &/Advisor: Professor Alexander Stoychev
Team Members/Role:
Connor Hand - Client Interaction and Team Organization
William Mayer - Meeting Time Tracking and Note-Taking
Peter Hurd / Noah Butler / Zachary Scurlock - Testing and Individual Component Design
Peter Hurd - Budget Handling

Weekly Summary

The objectives of this week were to continue constructing adder-subtractor units, design a PCB for our adder-subtractor and figure out how to get one made, develop Gaussian simulation further, decide how we are going to organize data in our EEPROMs and write a program to fill them in with data and work on prototyping circuit for input into our machine. We have made a schematic and learned what ETG needs from us when ordering PCBs. We have decided how we are organizing data into our EEPROMs for our decimal-to-binary conversion, and we have made progress on our program for writing to the EEPROMS. We have also related our adder-subtractor design directly to the vacuum tube diagram. The rest of our objectives this week are still a work in progress. No changes were made to the project during this week.

Past week accomplishments

- Connor Hand: Developed the adder-subtractor module schematic, reached out to ETG, and learned how to request PCBs from them.
- Zach Scurlock: Compared adder/subtractor digital logic circuit to vacuum tube circuit, and brainstormed more ways to implement the punch card input and output.
- Peter Hurd: Researched and prototyped some potential implementations for the punch card, continued compiling a list of new parts and materials to order
- William Mayer: Continued working on Gaussian Algorithms. Researched methods of PDF generating punch cards.
- Noah Butler: Created a program to convert a csv table for the memory map for the EEPROM into the format the EEPROM writing software needs

Individual contributions

NAME	Individual Contributions *(Quick list of contributions. This should be short.)*	Hours this week	HOURS cumulative
Connor Hand	Made adder-subtractor KiCad schematic, learned how to order PCBs from ETG	5	26
Zach Scurlock	Compared adder-subtractor digital logic circuit to the vacuum tube circuit, brainstormed/researched punchcard I/O implementation	5	25
Peter Hurd	Researched implementations for the punch card. Compiled a list of new parts and materials to order	5	27
William Mayer	Researched Components. Improved Gaussian Algorithm.	5	23
Noah Butler	Created a program to convert csv to the file format needed for the EEPROM programmer	6	24

Plans for the upcoming week

· Connor Hand: Work on writing a program that simulates punch cards from user input. Research how the carry/borrow drum was used on the original ABC.

· Zach Scurlock: Explore tablets that can be used for user input/output and research how the base-2 punch stored bits onto the letter-size paper.

· Peter Hurd: Work on Dr. Stoytechev's prototype base conversion circuit, put in our team's second parts order for more ICs, circuit components, and other materials to fuel our innovation.

· William Mayer: Researching control units and how I/O worked with the actual machine. Try to finish the Algorithm. Along with that, get started on the User Manual. Going to meet with Aldaco to pick his brain on the App.

· Noah Butler: Create the full base conversion table in Excel nand begin researching the memory circuit and control drum further

Summary of weekly advisor meeting

In Meeting 7, we outlined critical steps for finalizing the project by the semester's end. We discussed aiming for 1-2 iterations of PCB design and submitting a final version for manufacturing. The team will consult with Peter for KiCAD. To enhance usability, we considered adding a user-facing module with virtual components for execution tracing and slides, as well as creating conceptual diagrams to represent the machine down to its logic gates. Technical challenges remain, particularly around base-2 conversion, drum operation, and the interaction between punch cards and rotating drums, possibly involving a finite-state machine within the memory units. We proposed using interactive elements, like tablets or Raspberry Pi, to simulate the punch card experience, alongside developing a clear protocol for signal processing. Known components, such as the adder-subtractor circuit and base conversion drum, were distinguished from unknowns like control panel specifics and punch card mechanics, guiding task prioritization. Action items include creating an Excel model for modular base conversion, developing a PDF generator for punch cards, drafting a user manual, and simulating the ABC process. They plan to solidify the system of equations and conduct a mock Gaussian algorithm simulation in the next meeting, working towards a finalized system setup before dead week.