EE/CprE/SE 491 Weekly Report

03/02/2019 – 03/08/2019

Group Number: sddec19-23

Project Title: Network Arcade Platform

Client: Joseph Zambreno

Team Members:

- *Evan Mandle: Team Lead*
- *Alex Carpenter: Chief Engineer – Hardware*
- *Bryan Johnston: Chief Engineer – Software*
- *Alexander Schneider – Chief Design*
- *Zach Serritella – Meeting Facilitator*
- *Brian Shanders – Report Manager*

Weekly Summary:

For this week, the team continued to work on testing which games can run on the emulator. The team also continued to learn more about Retropie and how to properly run it. Also, started to work on the Design Document. The team continued to work on the design/layout of the menu and what features it will have. Worked on new redesign of arcade cabinet based off advisor's specifications. Finally, got training for the ETG machine shop and able to secure a second computer for testing.

Past Week Accomplishments:

- **Evan Mandle:** Made a 3D CAD model of the cabinet in Inventor (shown to the right). Installed Retropie to the system and extra packages including the Dolphin emulator. Researched cost for potential cabinet materials. Concluded aluminum body is not feasible.
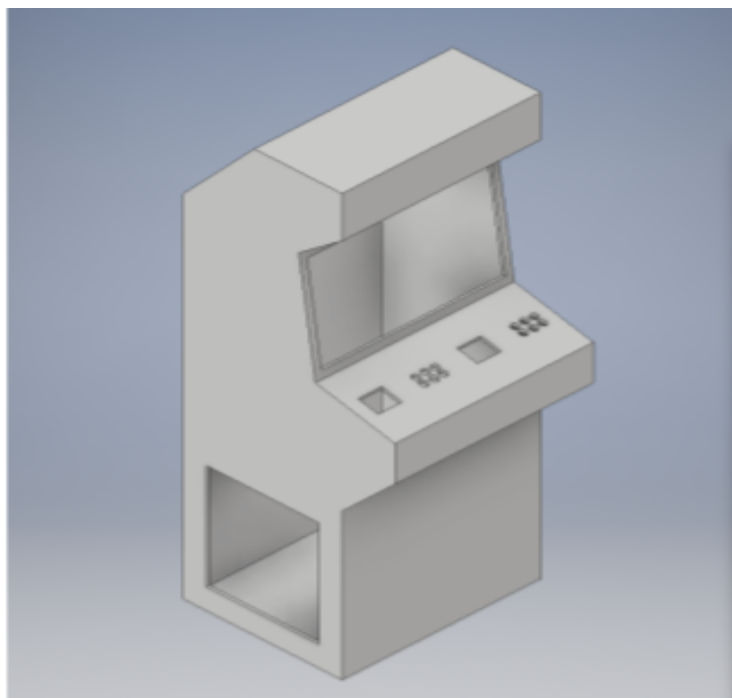
FIgure 1: Arcade Cabinet Inventor Model

- **Alex Carpenter:** Performed research on different encoders to determine the best way to read signals from the joysticks, pushbuttons, and GameCube controllers. Performed research on different Hall effect sensors to determine which sensor will be best for detecting the position of the arcade cabinet. Created a high-level diagram to map the electronic inputs and outputs of the system. Continued work on the design document.
- **Bryan Johnston:** Worked on downloading ROMs, installing the emulators to the system, uploading the ROMs to the PC, and testing the ROMs. Created a high-level diagram of our system to map inputs and outputs. Also, made a Pros and Cons list to help decide on a design.

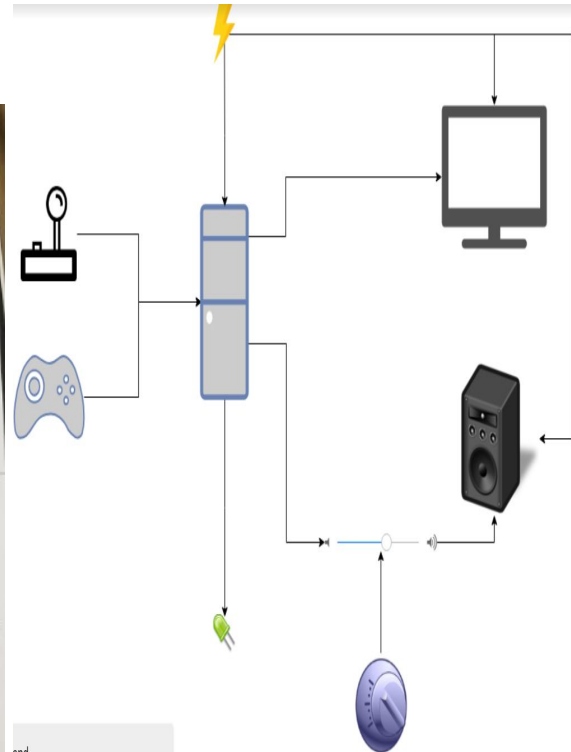*Figure 2: Pros and Cons List*   *Figure 3: High-Level System Diagram*

- **Alexander Schneider:** Worked on testing, troubleshooting and getting 30 out of 60 arcade games to load correctly and run with little issues. For the time being, the game testing is sufficient enough to move on, as enough games are functional for demonstration purposes, and any specific quality control/removal can be done at a future time. Assisted with design document feedback.

Game	On Games List	Overall Rating	Double Instancing?	Runs?	Graphics Issues?	Speed?	CPU Usage	Notes
Explanation	If it is on the list, the # is given.	How does it run isolated/single instance?	Can we run two instances of this at once?	Does the game run?	Are there any major graphical issues (flickers, etc)	What is the game's speed? (Some games may intentionally lag.)	What is the general CPU usage we see looking at the System Diagnostics?	Some general notes about the game's performance. Because of processing requirements, the GC games require more specific emulation notes compared to a basic "does it start" and notes if any.
Super Smash Bros. Melee	#33	Good	Yes	Yes	Minimal	Mostly 60 fps	40%	Most resource intensive game. Under most secnearios the game runs fine but under the general resource test (4 Ice Climbers on Fountain of Dreams) the game lags; however, this occurs on native console.

No.	Game	FBA (loads correctly)	MAME 2003 (loads correctly)	MAME 2010 (loads correctly)	MAME 2016 (loads correctly)	Does it work period?	Comments
1	Aero 1	☑	☑	☑	☑	☑	
2	Aero 2	☑	☐	☑	☑	☑	neo-geo error, otherwise Great!
3	Aero 3	☑	☐	☑	☑	☑	neo-geo error, otherwise Great!
4	Airwolf	☑	☑	☑	☑	☑	slight start error
5	Alien Vs. Predator	☐	☐	☐	☐	☐	Initalizes, fails to boot.
6	Altered Beast	☐	☐	☑	☑	☑	

Figures 4 & 5: Snippets of emulation testing.

- **Zach Serritella:** Worked on the design document, researched netplay in Retropie and then helped with button layout for the some of the games that were played.
- **Brian Shanders:** Worked on Design Document, researched on Retropie, work on menu design. For menu design, thinking of either having the games organized by categories/game console, which leads to the list of associated games with box cover and description(can be serious or fun), finally ending with how many players are playing before launching. The other design is a list of games with each having a demo/video of the game, then ask how many players, then launching the game.
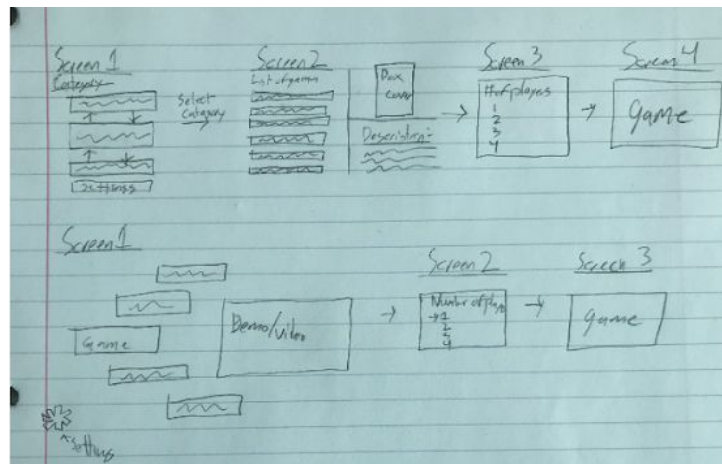

Figure 6: Two Design Flow of Menu: Tier System and General

Pending Issues:

- **Evan Mandle:** Need to determine which material would look best and be cost effective.
- **Alex Carpenter:** Need to determine how to build a custom encoder, which may involve some reverse engineering. Need to determine the specifications for a Hall effect sensor so that it will be able to penetrate the material that the arcade cabinet will be made from.
- **Bryan Johnston:** Determined there were unplayable MAME ROMs, which will need to be fixed.
- **Alexander Schneider:** Remaining midterms; otherwise, no major project-related issues.
- **Zach Serritella:** Making sure that everyone is on the same page for design, including the client, that the project is different and shows off the team's skills properly.
- **Brian Shanders:** Figure out more about how to customize Retropie menu design.

- **Everyone:** Ensuring that the team is addressing what makes the project unique. There was some uncertainty with the project in defining "Networked Arcade." After the next meeting, will have a clearer image of the project.

Individual contributions:

Name	Individual Contributions	Hours this week	Cumulative Hours
Evan Mandle	CAD design. Installation. Cost Analysis research.	15	32
Alex Carpenter	Design document, research encoders, research Hall effect sensors	10	25
Bryan Johnston	Testing MAME the emulation, Documentation of testing	10	25
Alexander Schneider	Testing, testing documentation, design document feedback.	7	22
Zach Serritella	Design document, research, agenda	6	21
Brian Shanders	Design Document, menu design, research on Retropie, Weekly report	7	21

Plans for the Upcoming Week:

- **Evan Mandle:** Plan on doing more CAD work and material research. Also, plan to work on designs and do the design document.
- **Alex Carpenter:** Begin design of a custom encoder and a circuit using a Hall effect sensor to determine the position that the arcade cabinet is in.
- **Bryan Johnston:** Researching and designing a custom encoder for our joystick and GameCube controls. HDMI splitter research.
- **Alexander Schneider:** Assist in the design document, take final midterm, sort a rudimentary list of games for main menu testing, research on design honing.
- **Zach Serritella:** Work on the design document and then trying to figure out what the project is and what is necessary to present it.

- **Brian Shanders:** Finalize design and start programming the layout of the menu, assist in the Design Document

Summary of Weekly Advisor Meeting:

The team had their weekly meeting with the advisor and gave an update and concerns about the project. The team presented an update on the game testing, design for menu and new design on the CAD model. The advisor gave advice about looking into smaller design/computer for portability, the layout of the joysticks and programs to help with menu design. As for team concerns, mainly on the uniqueness of the project, advised looking more into what the user experience is going to be and define it. Also, liked the idea of a custom encoder that the player can play either with joystick or GameCube.