

# Desktop Arcade Cabinet

By: Sdmay23-26

Advisor: Mathew Wymore

## Introduction

Our senior design project was to design, build, and test an adaptable arcade machine. From 80s kids who grew up with the classic arcade cabinet to 2010s kids who never played the classics, we challenged ourselves that anyone could enjoy our project.

## Overview

With our target audience being retro-arcade enthusiast, we produced an adaptable arcade machine that holds its heritage to the originals. With a common button layout and similar style, our target audience will be drawn in.

But many younger audiences might feel more comfortable using more modern controllers. We have added functions to allow an ability to map any controller that can connect over USB.

To continue to be adaptable, the design allows users to upload their own games they might find online. With a game uploader application saved on a USB thumbdrive, users can download and install new games.

## Methodology

For hardware using our time researching and our intuition, we figured we would need some way to power our machine, controls, audio, display and a lighting system. Each component was unit tested and then compiled at the end.

For software we decided to split up the task one person for the game upload UI one for the UI on the PI, and two for mapping the controls. This way we could all progress our individual parts during the week and meet up on thursdays to test the components together.

## Results

From our client's specification, we managed to meet all but one.

- The product need to fit within a 2 foot cube. Final dimensions are 19" by 18" by 24".
- The product needs simple controls (audio, controller, power).
- Audio control is right in front of the speaker.
- Retro arcade controls or an ability to map and USB controllers.
- Power to the system is controlled by a button press.
- A simple UI to display and select games
- UI can select, display, and set up controls
- Upload new games via USB
- The product must be lightweight and able to be carried by one individual.
- While we added slots for handling, our final product ended up being heavier than we wanted (36.8 pounds)

## Challenges

- Computing power with Raspberry Pi
- Original power supply overheating
- Needing .jar files rather than .exe files

## Impact

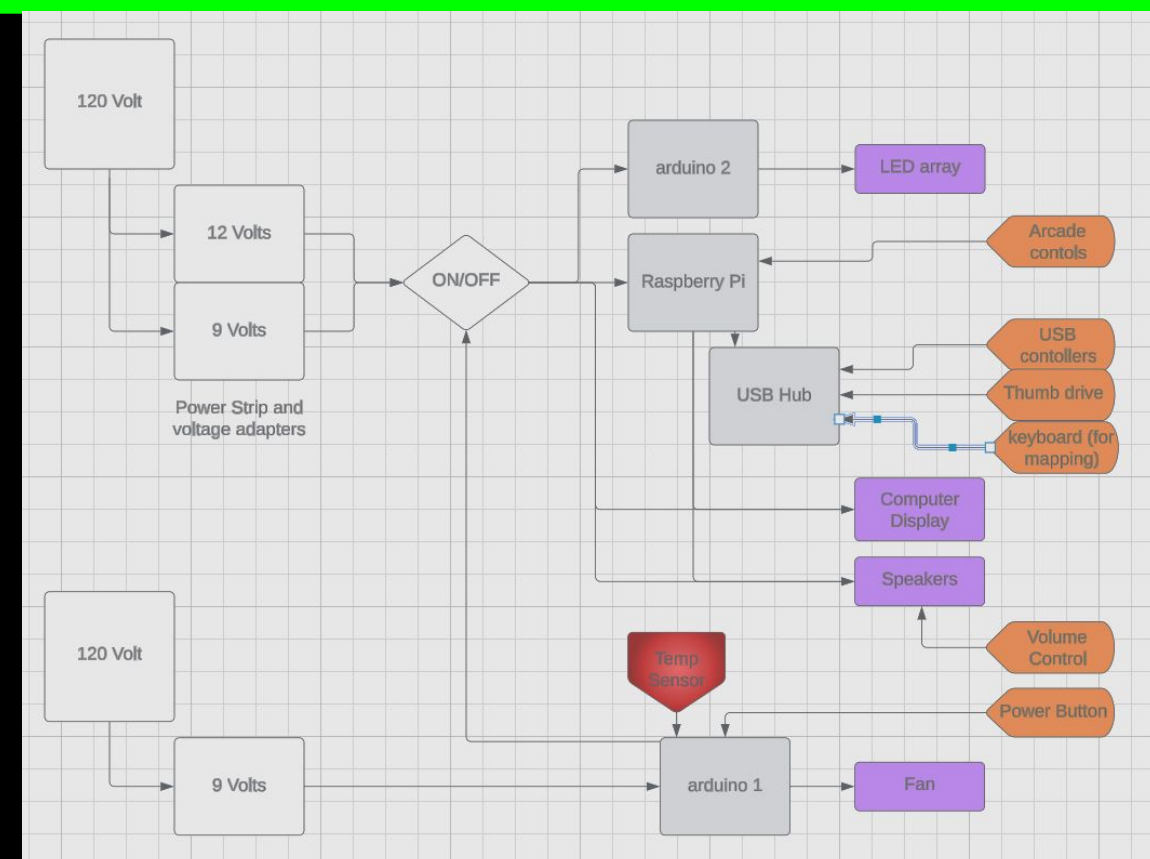
The client has seen interest in the product when posting updates on social media. The individuals that reached out to our client were all younger than 25 years old. Younger generations know of arcade cabinets, but some have never got to experience to play on one. Discussing with our client, the only time he got to play on an arcade was in Davenport at an arcade bar. This new product allows him and others around his age to experience a older style of gaming.



## Implementation:

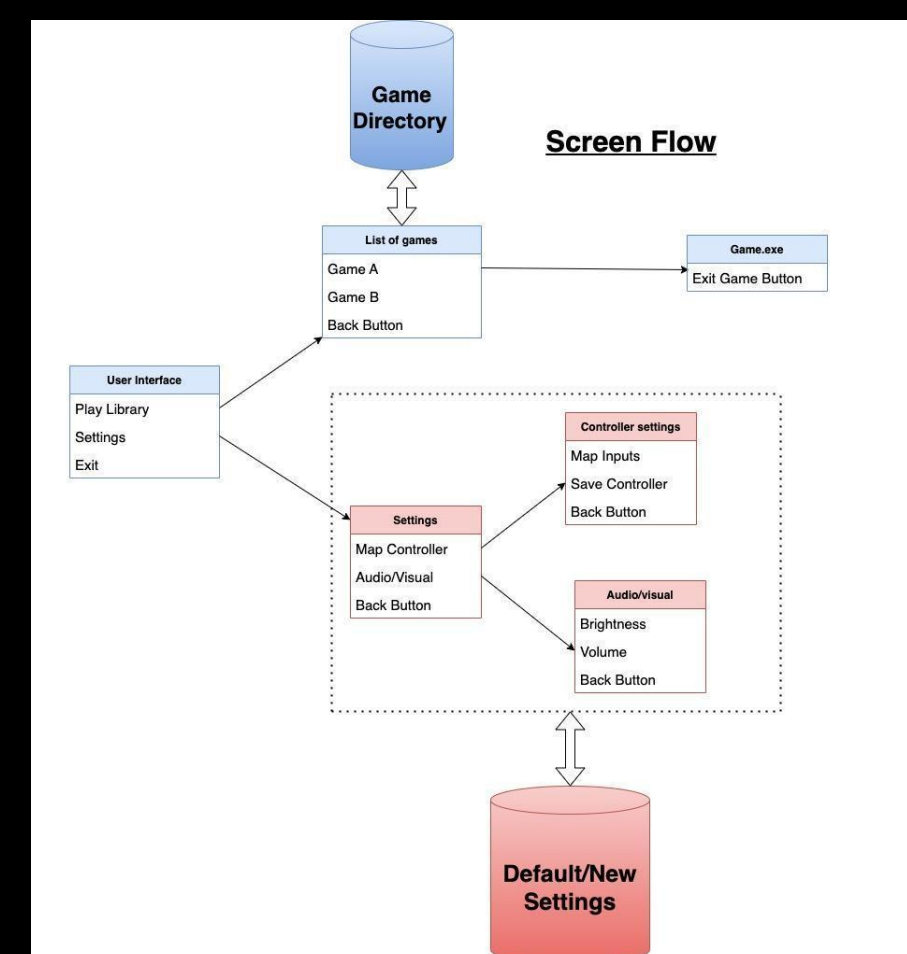
### Hardware system

- Implemented a DS 1822 temperature sensor
- Two arduinos
  - #1 controls power and temperature control
  - #2 controls the LED matrix
- Used 7 74HC595 pin extenders



### Software system

- Multiple screen UI for Interfacing with PI OS
- OS level calls for mapping Controller events to key events
- UI for Prepping Game filled USB so it can be interpreted by PI
- Jar based games launched by the PI's UI using linux commands in code
- Jar for exporting user preferred controller layout files



## Skills & tools used

- PCB / Circuit Design
- Soldering
- Carpentry
- 3D CAD Design
- Java JFrame
- Carpentry and required tools

## Conclusion

As a team, we experienced and learned to work through taking on a project with loose goals. Our client left a lot of the expectations open-ended, so we needed to define goals and a schedule for ourselves.

Working around classes and insuring we all had something to work on was another situation we ran into. With certain jobs like creating the UI and power supply, students were left waiting to test their parts. If we scheduled our time better and communicated when we needed help, we could of avoided this situation.