EE492 SDMay23-26

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Client: Bradley Yenger

<u>Engineers:</u>
Bradley Yenger
Liam Tureaud
Mark Gores
Jeffrey Marsh
Alex Glass
David Helmick

Introduction

Our client was looking for a retro way to play old arcade games, while adding some modern technologies. After discussing with the client, we broke the project down into four major categories.

- Needed to fit in less a 2’x2’x2’ area
- Product must be lightweight and able to carry by one individual
- Needs simple controls (audio, controller options, power)
- A simple UI to display and select games

Implementation Architecture

Hardware:

- Construction of Cabinet
- LED Display matrix
- Voltage supply circuit (3.3v, 5v, 12v)
- On/ Off circuit
- Temperature sensor circuit

Software:

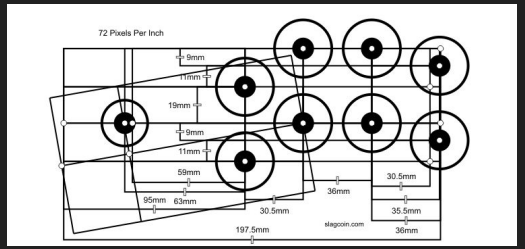
- Raspberry PI OS
- Controls Software (map key binds)
- Home Screen UI (Java Swing)
- Select Game Screen UI
- Import Game UI
- Jar Files of Games

Hardware

- Construction of the cabinet
  - Cabinet and controls mimic common looks and layouts

https://retromash.com/2016/02/09/building-a-home-arcade-machine-part-3-cabinet-design/

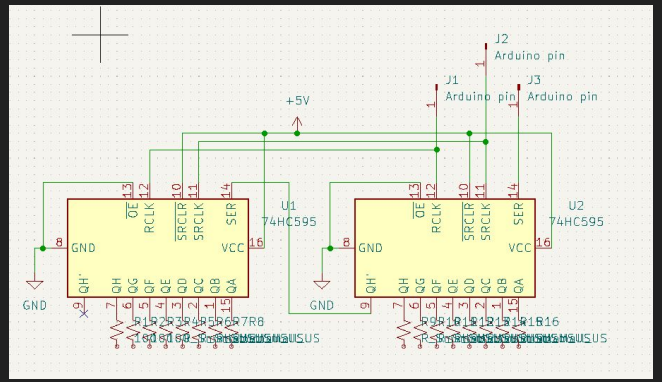
https://www.vintagearcade.net/shop/arcade-games/tapper-arcade-game/

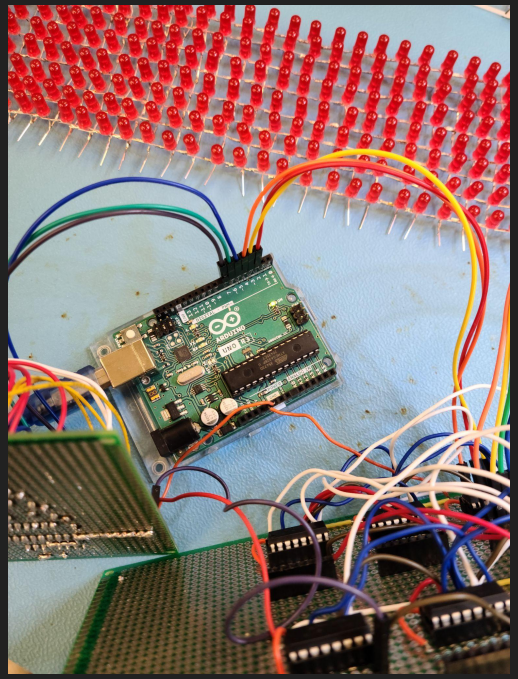


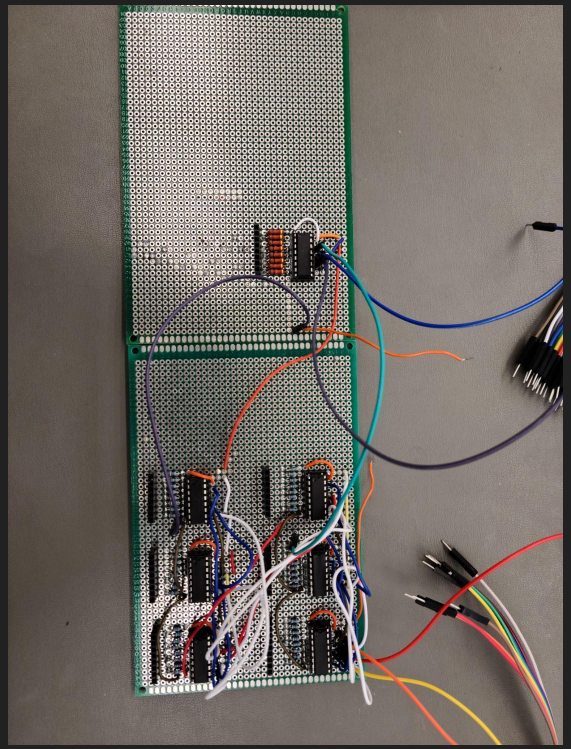
-Sega layout
https://www.slagcoin.com/joystick/layout.html

Hardware

- LED Display matrix 8x45
  - 74HC595
  - Row Driver x1
  - Column Drivers x6
  - Arduino

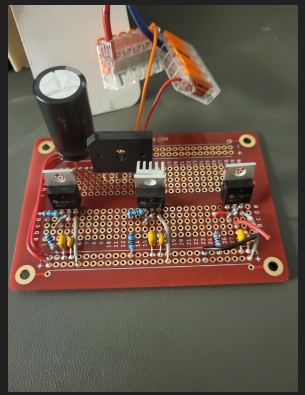


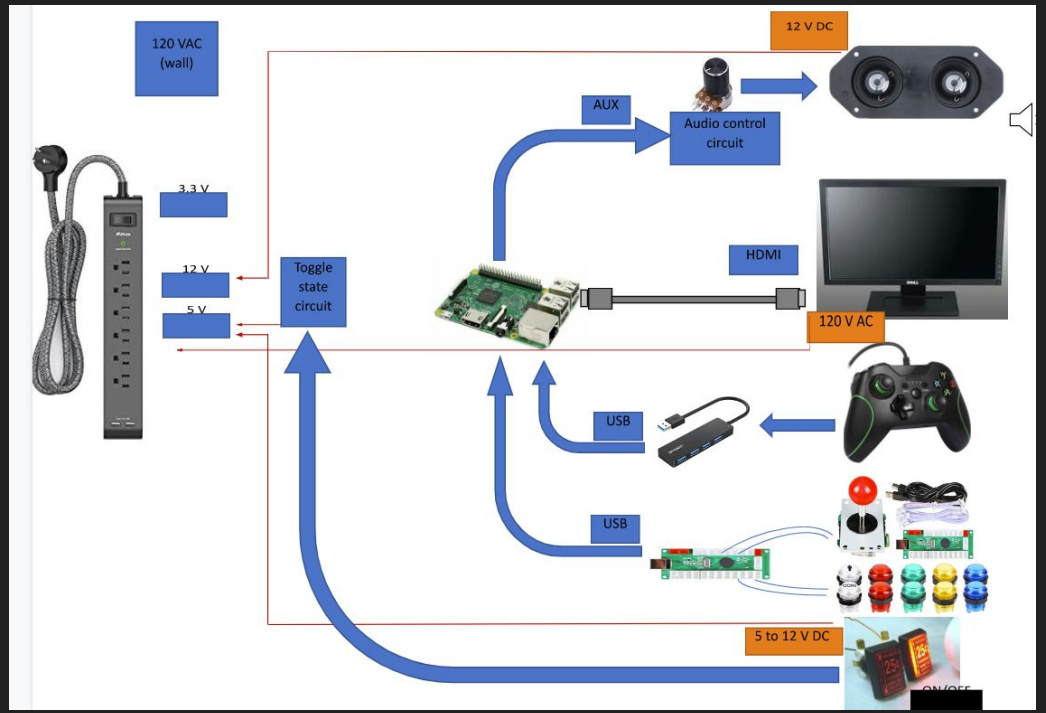




Hardware

- Temperature Sensor / Fan System
- On/Off switch (relay)
- Power Circuit
- Controls
- Audio





Software

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- Select Game Screen UI
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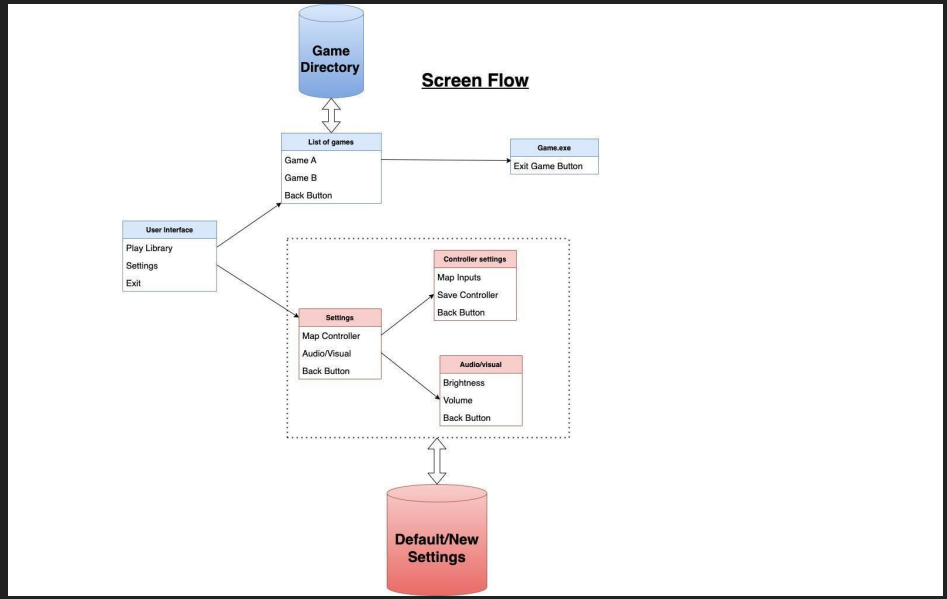
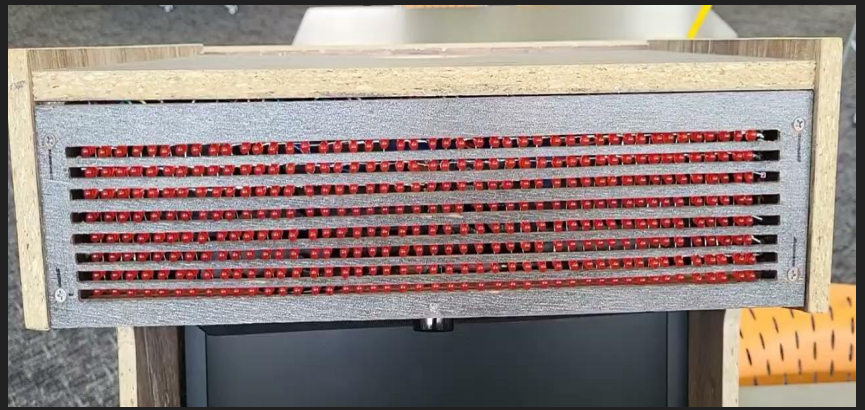
- Jar Files of Games

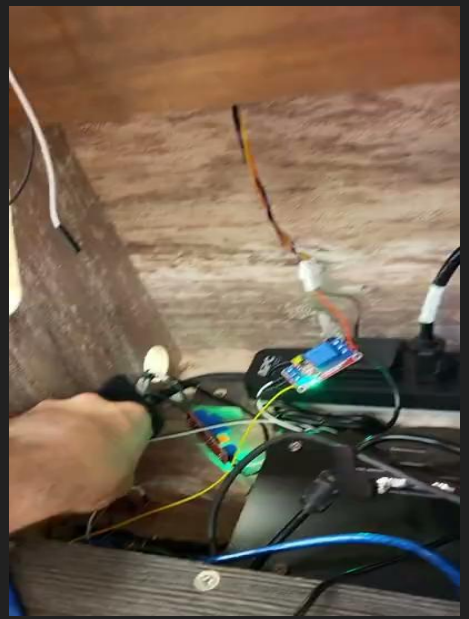


Work Accomplishments

Hardware:

- LED Display matrix
- On/ Off circuit
- Temperature sensor circuit

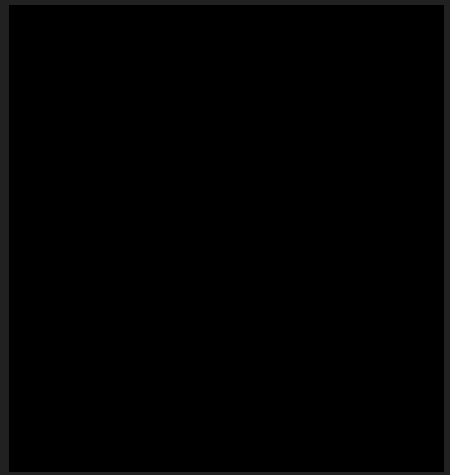




Work Accomplishments

Software

- Made a successful UI
- Successfully mapped controllers to keystrokes
- Added a function to upload games through a thumb drive



Key Contributions

Name	Key Contributions
Liam Tureaud -Electrical Engineer	- LED Matrix and Driver Circuits - Hardware concepts and implementation - Concepts for the cabinet
Bradley Yenger -Electrical Engineer	- Constructed the cabinet - On/off button circuit, temp sensor system, wiring of the arcade controls, soldered 400 LEDs
Mark Gores -Software Engineer	- Mapped controller to key bindings - Wrote code that allowed any controller to be custom mapped to key strokes - Made the app launch on startup

Key Contributions

Name	Key Contributions
Alexander Glass -Software Engineer	- Helped map key bindings to controller inputs - Tested control integration with UI and games
Jeffrey Marsh -Software Engineer	- Built UI for Raspberry PI - Worked with Linux commands to interface with PI in code - Debugged many issues concerning UI
David Helmick -Software Engineer	- Designed and built game uploader application (USB drive program). - Helped with testing and debugging of arcade cabinet. - Assisted other teams whenever possible.

Challenges and Solutions

- Voltage supply circuit (heat sink)
- Original On/off circuit
- Communication and working around classes
- Implementation of LED circuit

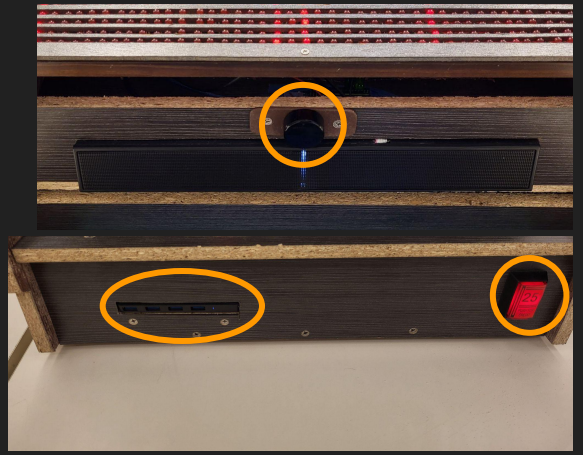
- All java libraries (or at least all I could find) for accepting controller input have been depreciated and not supported
- ARM processor architecture
- Mouse on screen in main menu (made mouse invisible)
- Menu wouldn't fullscreen (hid upper taskbar)
- Controller input varied from Java input (built function to map all keys properly)

Future Work

- Custom Arduino
- Fixing the LED Display
- Reactive lighting
- Swapping the microcontroller for On/off circuit and temperature sensor (overkill)
- Find ways to implement executables (windows instead of linux)

Conclusion

- Needed to fit in less a 2 foot cube
  - Fits in a 19“ by 18” by 24” cube
- Needs simple controls (audio, controller options, power)
  - Audio control is available in front of the speaker
  - Retro arcade cabinet or an xbox controller (via USB)
  - Power to the system is controlled with a button press
- A simple UI to display and select games
  - UI can select, display, and set up controls
  - Upload new games via USB



Conclusion

- The total funds of the project was a limit of 500$
  - We sayed under this limit by over 100$
  - Price could be decreased further with a second build
- Product must be lightweight and able to carry by one individual
  - Weights 36.8 pounds, and has slits to hold while carrying

UPDATED	
Bluetooth mouse and keyboard	$3.00
Speakers	$7.00
arcade controls	$27.00
Power button (arcade style)	$9.00
monitor	$129.00
wood	$42.00
feet for bottom	$3.00
fan	$26.31
LEDS	$23.96
standoff pins	$6.99
voltage supplys	$35.99
ribbon cable	$8.99
digikey orders	$49.29
boards	$19.20
TOTAL	$390.73

Questions?

Thank you for listening!