

## **Grand Scheme:**

Selected Design (Initial):

- Adjustments made to incorporate groups ideas:
  - Potential joystick(s) instead of remote if we can use two
- Advantages:
  - **Easy wire access and adjustability**
  - **Aesthetically pleasing**
  - Design tests well with audiences (in 1980s pre macintosh 3 release)

Selected Game:

- **Pong**

Dream Game:

- Doom

Advantages:

- Easy to develop
- multi AND **single player**

## **Day-To-Day:**

February 14 2023:

Potential Games:

- Breakout
- Pong
- Snake
- Maze game
- Space invaders

Console Design:

- Gameboy
- Original macintosh computer (Mac 3)
- DS type design
- Atari 2600

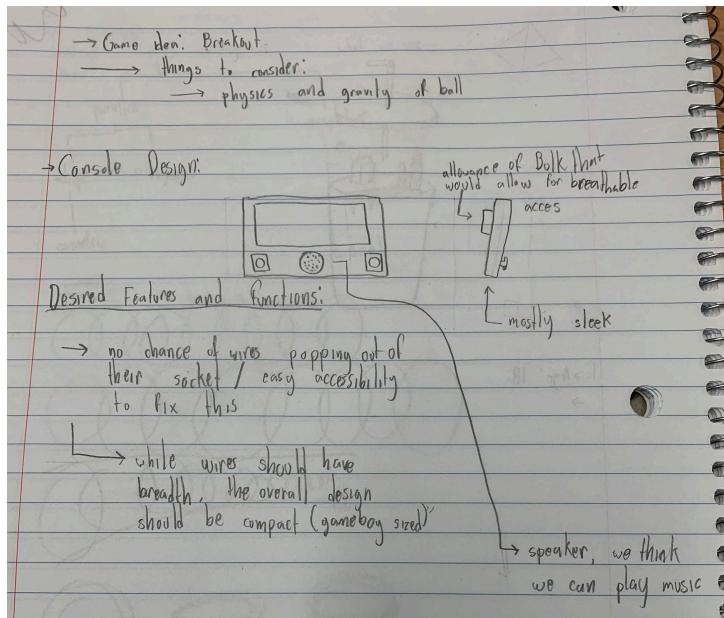
Sensors:

- Motion
- Sound

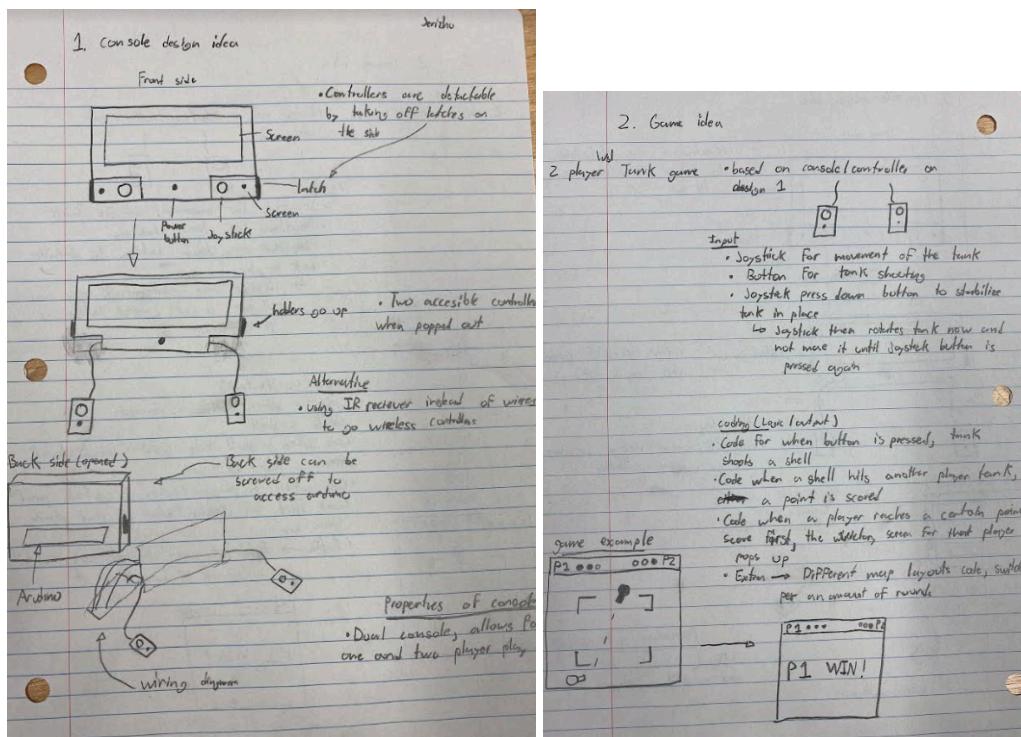
February 15 2023:

- We Selected the game PONG
- Console designs: (DECIDED ON CONOR'S)

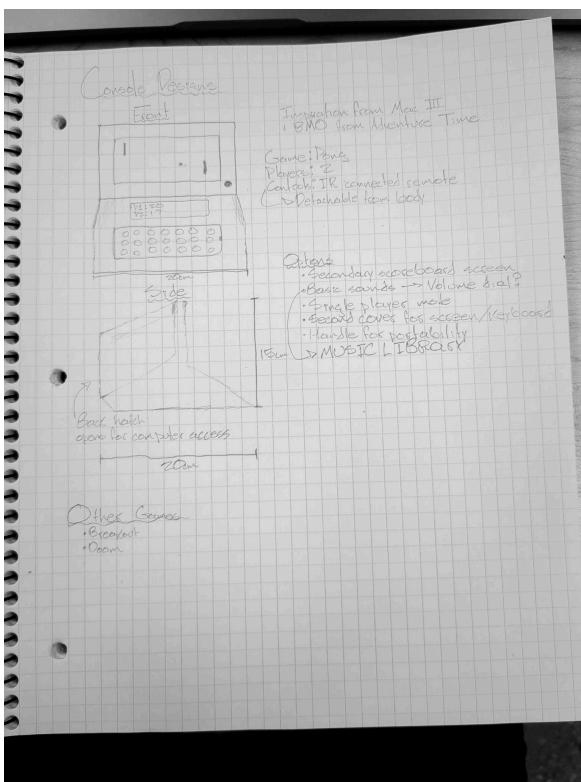
Sam:



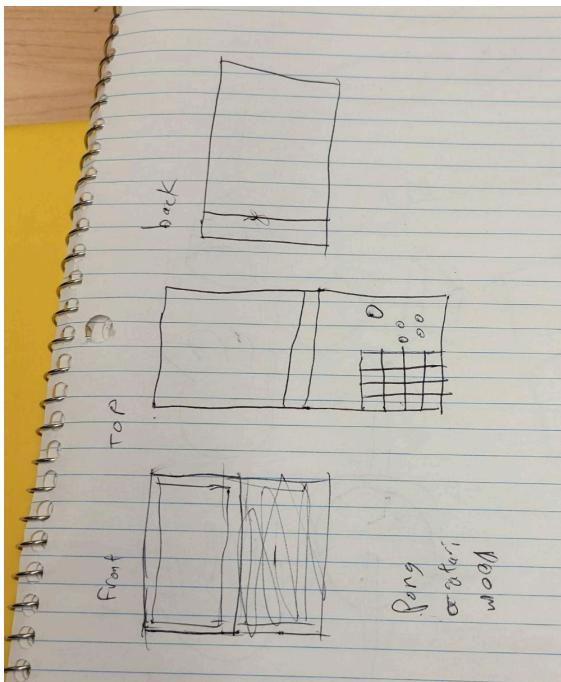
Jericho:



Conor:



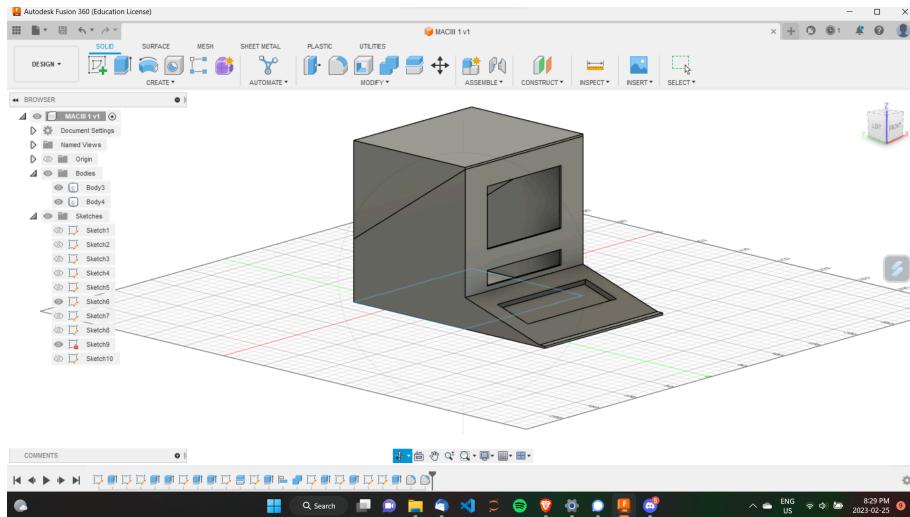
Declan:



## February 28th

CAD model (Conor): Over the last few days has created a rough 3D model for the project. Dimensions and functionality to be considered still.

Considerations: Must be large enough to accommodate circuitry. IR remote might be too hard to program, perhaps arcade machine style buttons would be more within our skillset.

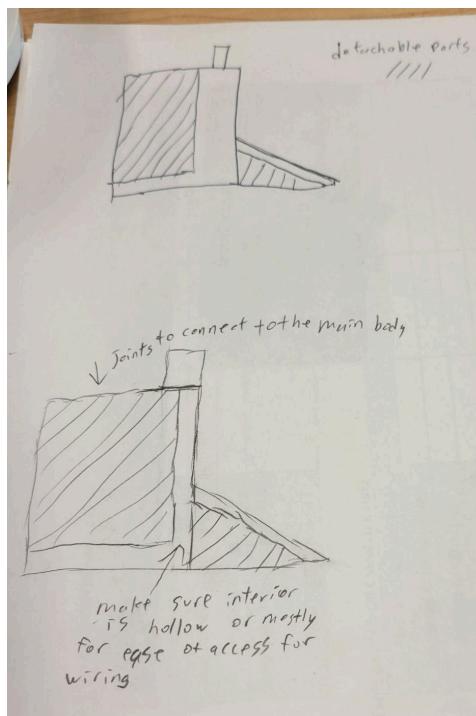


Sam: Very very basic program and circuitry established; To be developed further.

- [https://projecthub.arduino.cc/bruno\\_opaiva/2e30f54e-3133-47dc-83b0-83fbdbdab44e](https://projecthub.arduino.cc/bruno_opaiva/2e30f54e-3133-47dc-83b0-83fbdbdab44e)

## March 1

Declan: resign ideas to the rough 3D model. Looking at how to make joints in fusion 360. Also researching what materials to use for a rough model. Foam or foam-core board.



Sam:

- Now considering 1 player game as code is easier to follow and debug at the moment  
<https://wokwi.com/projects/318864638990090834>  
<https://projecthub.arduino.cc/5vdc/bc2ae146-6451-48c3-a1af-3dac2275a05c>

### March 4-5:

Sam:

- After almost completely rewriting my source program, -due to the original not using the TFT\_eSPI library or the same screen and due to a lack of a source project that does- I was facing the issue of the ball and paddle leaving a trail everywhere.
- After struggling with this for hours I made a reddit post about it on r/arduino and received this very helpful advice.
- Summary: Because I can't erase from the screen, I can instead paint over a position with black when the ball or paddle changes position.



A screenshot of a Reddit post on the r/arduino subreddit. The post is by user ripred3 and was made 3 days ago. It has 500k upvotes and the title is "my other dev board is a Porsche 😊". The post contains a reply from user Maleficent-Space89! who says: "Hey Maleficent-Space89! Oh man you're so close! And this is a great example to learn from!" Below this, a comment from ripred3 provides a solution to the trail issue:

- when the ball or the paddle moved it left a trail instead of deleting its previous position making sprites sound like the logical alternative

On line 81 you have:

```
ball_X += ballVelocityX;
ball_Y += ballVelocityY;
```

Change that to erase the previous ball first *before* you update the position and draw the new ball! :

```
// Erase the ball by drawing it in BLACK:
tft.fillCircle(ball_X, ball_Y, ball_rad, BLACK);

// now we can advance the ball's position and draw the new spot:
ball_X += ballVelocityX;
ball_Y += ballVelocityY;

// Draw the ball:
tft.fillCircle(ball_X, ball_Y, ball_rad, WHITE);
```

Same thing goes for the paddles. That will stop the trails.

- the right paddle wouldn't move

```
if(aa == HIGH){
    paddle1_Y++;
    paddle1_Y++;
}

if(ab == HIGH){
    paddle1_Y--;
    paddle1_Y--;
}

if(ba == HIGH){
    paddle1_Y++;
    paddle1_Y++;
}

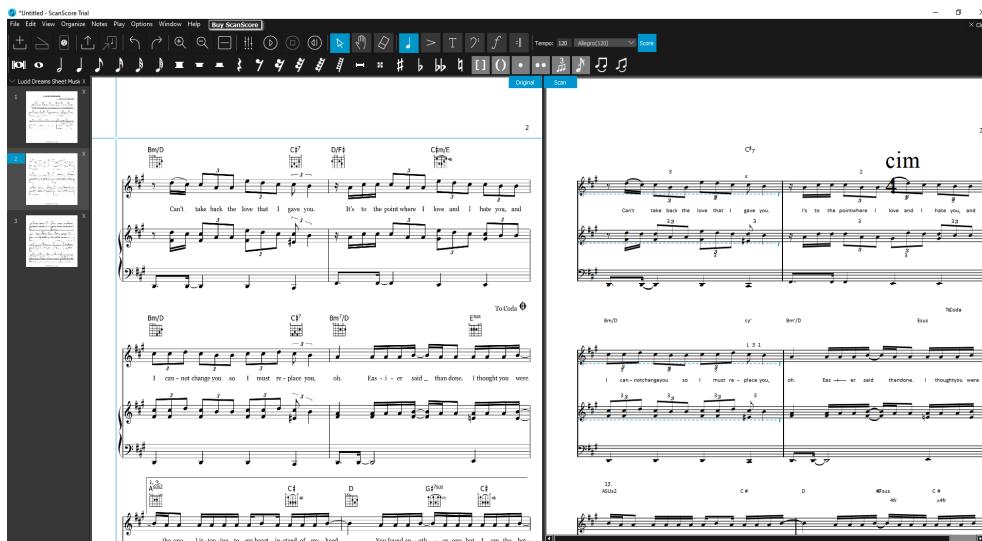
if(bb == HIGH){
    paddle1_Y--;
    paddle1_Y--;
}
```

The variables didn't get changed when you copied and pasted it heh! Done that plenty of times myself. The ones used with `aa` and `ab` should be `paddle0_Y`, not `paddle1_Y`.

- I stayed up all night and now have a fully-fledged 2 player pong game
  - It has room for quality improvements
- As for features i still want to add:
  - A1 logo that plays before each game
  - Would be awesome if we could add images (i bet i can via sprites)
- music AND/OR music library (seems easy enough in theory)
- More malleable circuitry
- Conclusion: I'm the GOAT
  - Other things to note and ask TA/prof about:
    - Ball always starts on left
    - Ball erasing other texts
    - Button-wire orientation
- CURRENT PROGRAM: <https://wokwi.com/projects/358561308730603521>
- Uses only buttons pending joysticks

### CUSTOM music implementation process:

- One can easily acquire music sequences in C from the internet (basics like harry potter, star wars, etc.)
- To implement unique or niche music the following process is used. The process itself is very simple but figuring the process out was kinda difficult.
  1. Obtain SHEET MUSIC of chosen song(s) (anywhere off internet; difficulty: easy-medium)
  2. Use scanscore (14 day trial) to convert sheet music of chosen song(s) to XML/MXL file (difficulty: easy; figuring this out/finding a suitable, free program medium-difficult)



3. Use XML/MXL to arduino C parser to convert into arduino recognized notes; very niche program on github but also first result of this specific query (difficulty: medium because niche)

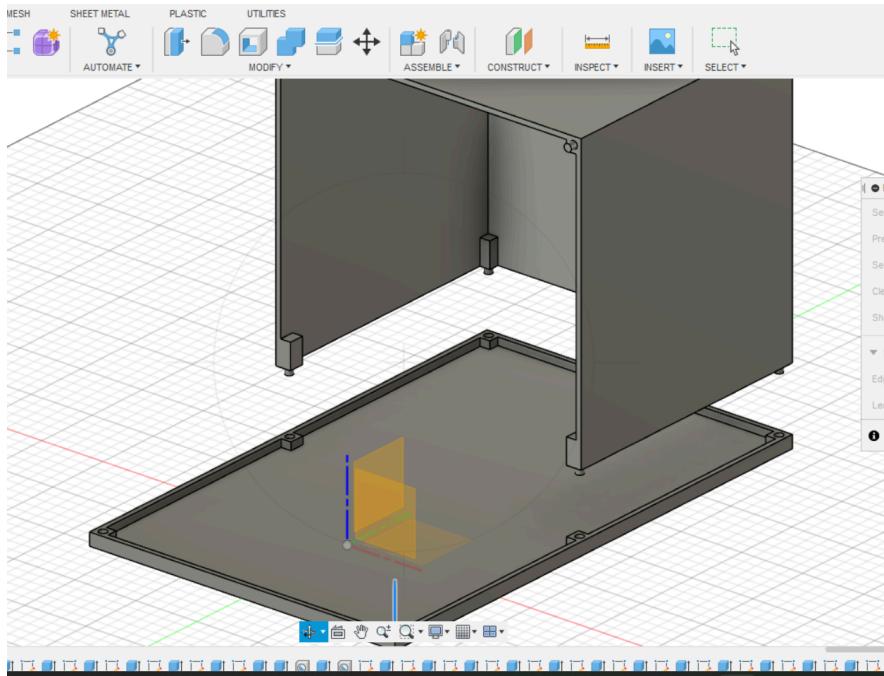
4. Properly use converted code within larger program (difficulty: easy)

## March 7:

## Possible Improvements:

- Menu/Library to start game/exit/play music
  - Joysticks if becomes available
  - If unavailable, button extensions; given buttons are inept
  - **Optimized wiring/resistors**
  - Soldering
  - logo/branding
  - **Coloured ball/paddles (should be possible because its still painted over with black)**

## CAD Updates (Conor):



The main body of the console has been fitted with hole/post connection joints. The bottom will be attached permanently after buttons/wiring has been installed, while the back will remain detachable for easy access to computer components.

#### **Gantt Graph for project management:**

[Gantt Graph - Graph \(canva.com\)](#)

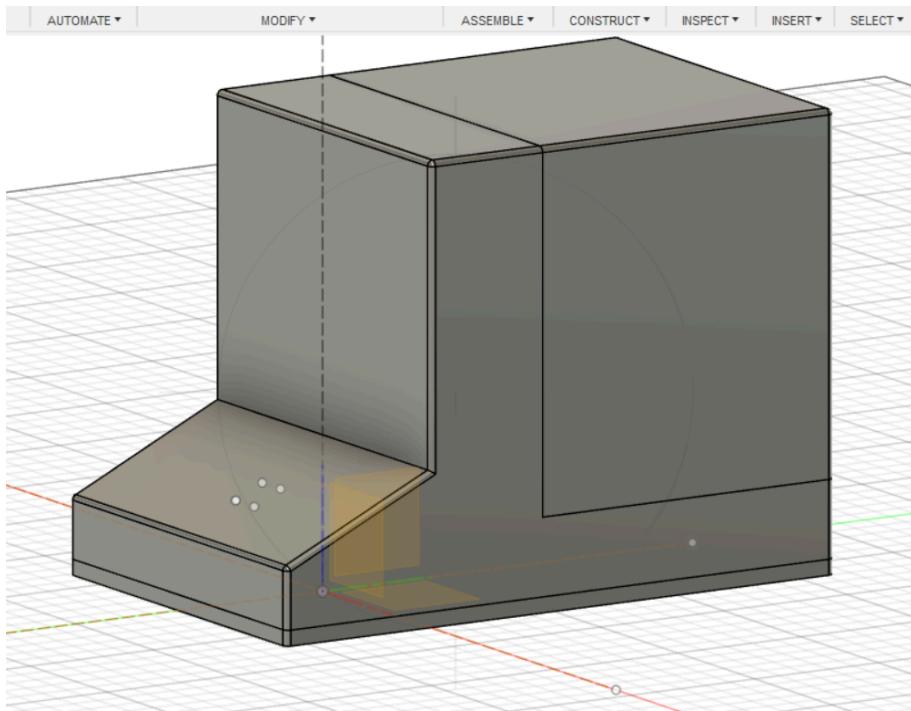
#### **March 8th:**

Issue encountered: what is the best way to attach buttons to the console? Are we going to use a breadboard or the solderboard attachment?

#### Possible Solutions:

- Direct solder connecting buttons by wires
- Connecting buttons to breadboard, and using button extensions to depress them
- Arduino attached solder board using same button extensions as above

## CAD Update:



## Improvements:

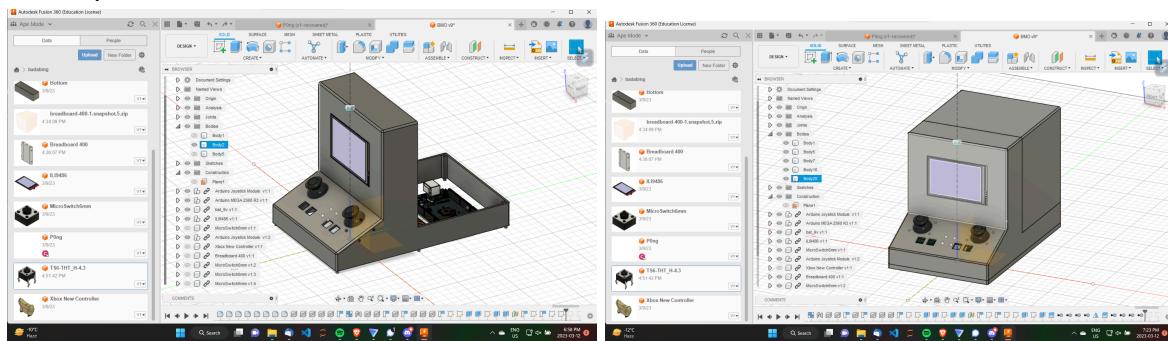
- Fileted edges
- More secure lid (holes scaled down)
- Body has been scaled up to incorporate battery
- Make sure circuit works with battery and switch

## March 15th:

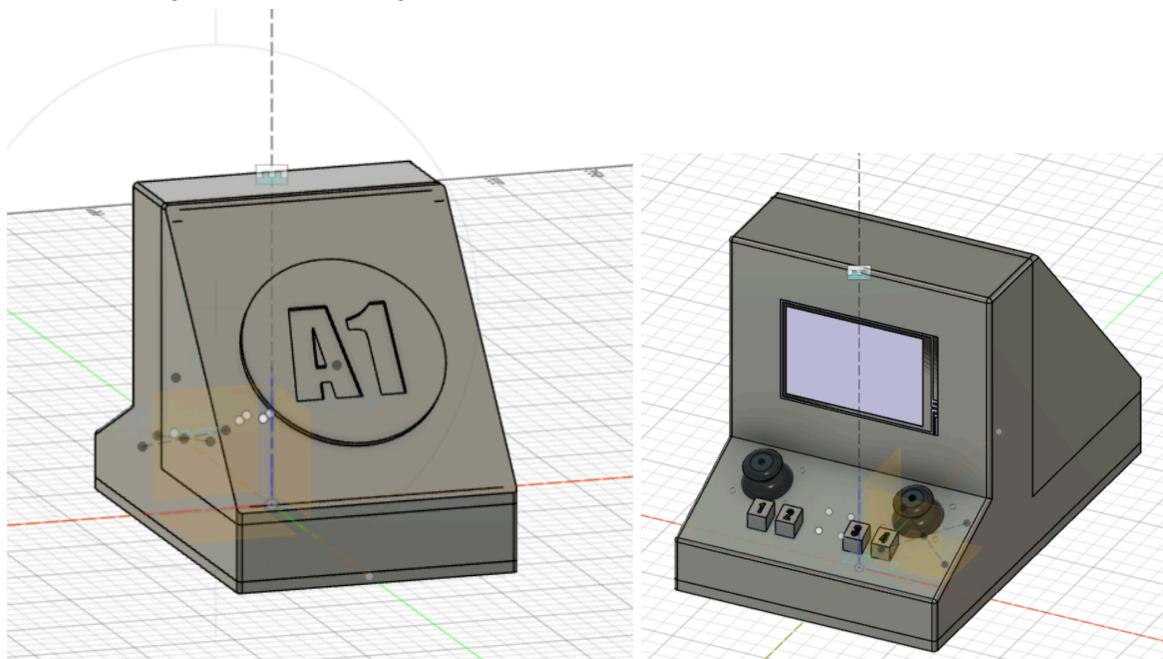
### Program updates:

- Remaining:
  - button multi functionality; need TA help
  - Score erasure, seems impossible to change without slowing down the game exponentially
- Changes made:
  - ball starts in middle every round and randomly goes either left or right
-

## CAD Update:



- Successfully uploaded scaled CAD models of arduino, joysticks etc.
- Joysticks now have a proposed mounting protocol
- Button layout aligned with breadboard, button extensions yet to be created
- **Ready to print as early as the end of the week.**



## End of Day Update:

- Model now includes group logo, as well as fitted button extensions

## Overall Remaining Additions

- Code for battery + on/off switch
- Button keycaps(3D printed add-ons to provided buttons, basically upscaled buttons to fit evenly and steadily on the control board)
- Possible text that says “first to this score wins”
- Text to state what side is player 1 and 2

Grey -ground

Purple - 5v

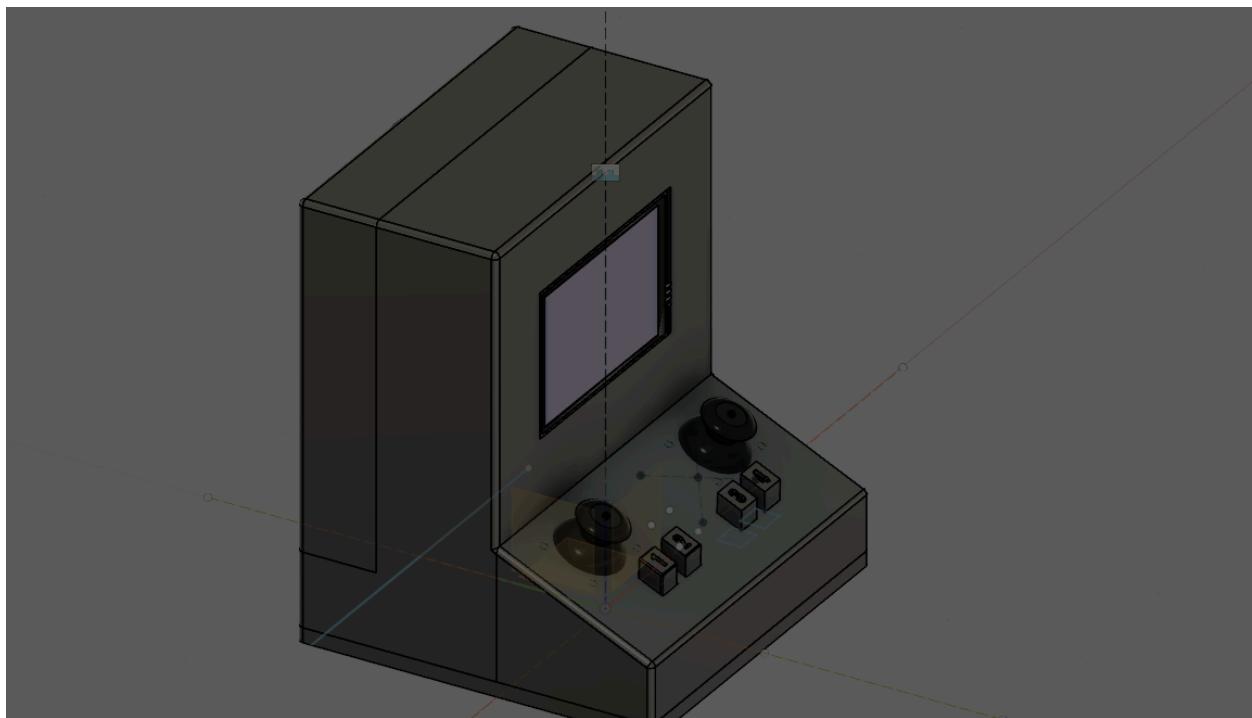
Black - VRy

White - SW

### **March 26:**

- Assembly began
- Roadblocks:
  - Pegs too short
  - Design does not account for usb slot
- Solutions:
  - They are being manually extended using pegs from old unused prints
  - Usb slot soldered in; not pretty, but functional
- Presentation notes:
  - Slides 1-5 → Jericho: talk about project requirements and how we fulfilled them and our objectives as a team (1 minute) – might need to stretch a bit
  - Slides 6-9 → Conor: talk about prototype and game selection and best equipped to talk about where the design started and how it became what it is today (1-1.5 minutes) — prob no need to stretch, plenty of considerations to discuss
  - Slides 10-13 → Sam: talk about program and circuitry/functionality development overtime (1-1.5 minutes) –might need to condense
  - Slide 13-18 → Declan: explain game logic as explained in presentation; not word for word. (1 minute) – might need to condense MAYBE
  - Slide 19: → idk: We have the blueprint, with your investment, we could also have the means to make this blueprint a reality and make YOU very rich.
- Add relevant images to barren slides

Most recent evolution of the Almanac



### **Scripts:**

Jericho:

Conor:

Things you should talk about other than what's written:

- Describe sam and jericho initial design: gameboy/streamdeck type designs
  - both relied on having 2 joysticks which posed a risk,
  - were much sleeker but didnt acknowledge the space the circuitry could require.
- Game selection:
  - Sam and declan will further go into why pong was the best option in terms of game logic and our limitations but for some time we played with the idea of pursuing making games like DOOM, tank, or breakout
  - Or even the possibility of multiple games but ultimately settled on PONG as it met project requirements and would still test us
- Initial PROTOTYPE had sharp edges which came with risks such as it being more easily damageable and a potential hazard.
- As we progressed we realized we did not need as much space inside the console as we initially thought and transitioned from large box shape, to a slanted edge shape, to a sleeker box shape which made the console much more ergonomic.
- The final design it more streamlined for the user but also decreased its cost of assembly per unit which we know is important to potential investors.

Sam:

- we went into this project with high hopes and expectations for ourselves and as mentioned, in our initial plans PONG was a fall back, something easy to get out of the way before proceeding to a real game like DOOM.
- Boy we're we wrong
- 
- Not long after starting I realized I would have to write almost the entire game from scratch, the functions of the TFT\_eSPI library were not one to one with other screen libraries and I had to do a lot of learning
- Next we have my unique music library creation method, which is proprietary and you will all be signing an NDA after the presentation.
- Then we brainstormed as a group and came up with a clear list of objectives for the game; balancing being reasonable and also shooting for the stars
- And lastly we begged every group in the class for a joystick until we found one who didn't need theirs
- our game relies simply on the operation of two paddles each controlled respectively by a joystick for a simple up/down input
- To track this movement and the movement of the ball, I used etch-a-sketch logic where a moving object is drawn, erased, it's position is updated, then is drawn

- The music library specifically uses the millis() function and NOT delay() so that music can play while other functions still run and operate
- Before we move to the explain our console this is the very unique music implementation method In which I had to obtain sheet music for a desired song which I would put in a program called Scanscore 3 which converts musical notes into XML code THEN put this XML file into a parser which converts it to Arduino C. On its own this code doesn't work logically as delays cause all other functions to halt so I also had to rewrite this program using the millis() function instead.
- Now that's a lot of complex jargon but to summarize: I turned water to wine
- LAST SLIDE: In summary, our console is a state of the art design which gives the user the opportunity to play a simple, logical, fun game using joystick controls and ADDITIONALLY have access to a fun music library and informative control menu

Declan:

Things you should talk about other than what's written:

- How the game initiation sequence has plenty of room for the names of investors and sponsors.
- how the music library can be any 3 songs which can be a great financial opportunity as artists could pay to have their song promoted on our console