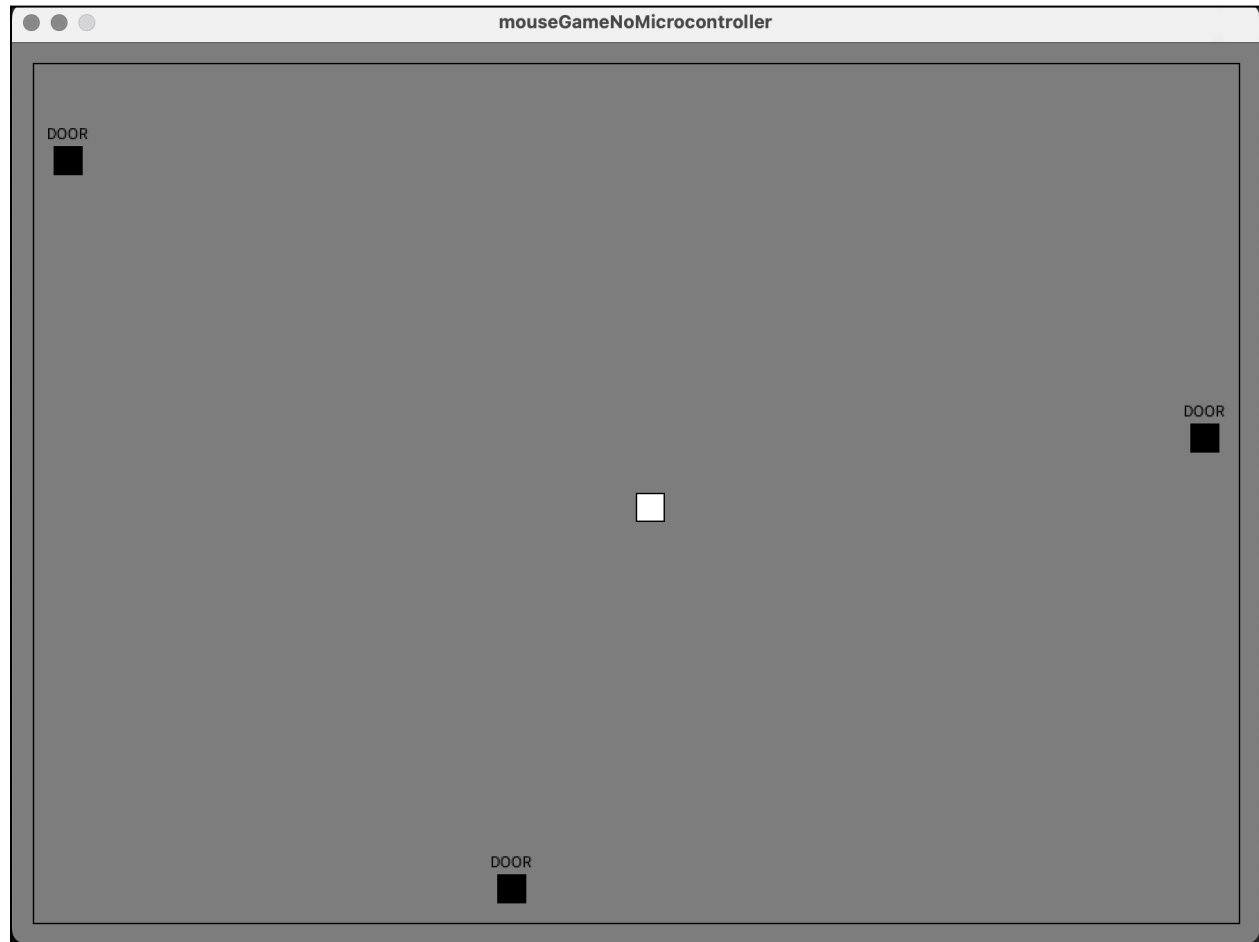


Rukayat Akinola
MTEC2280 - Physical Computing
Final Project Proposal

Catch



Sensors & Actuators:

- ESP32 S3
- Processing IDE
- Arduino IDE
- Potentiometers x2
- Push Buttons x2
- Or XY Joystick Controller & Push Button

NOTE: I want to replace the Potentiometers and one of the Push buttons with a single XY Joystick controller, with two Potentiometers and a Push Button embedded inside.

Concept Description:

The player is the white square that moves around the canvas using two potentiometers. PotOne controls the xAxis, and PotTwo controls the yAxis. The additional two push buttons would serve as the controls for the three doors in the scene. ButtonOne will allow the player to enter any of the three doors in the scene, which teleports them to the next door in the Doors array sequence. The doors function like portals would in adventure games. When the player is directly on top of the doors, with some deviation, and clicks on ButtonOne, they will be teleported to another door in the scene. ButtonTwo would be programmed to have a randomizing effect. When clicked, the position of the three doors in the scene would be changed. The feature would be useful when players want to get closer to the yellow/golden square that randomly and temporarily spawns into the scene. Hence, the project's title is "Catch." The final interaction will include a score bar for how often the player catches the golden square. As with the doors, the player clicks on ButtonOne to enter/catch the golden square.

Independent Research:

I have a good grasp of all the hardware and software components covered during this course thus far. And these are the same materials and interfaces I would employ throughout my project, with minor deviations.

Hardware:

- As mentioned above, I'm interested in incorporation and an XY Joystick Controller instead of the tried and true potentiometer. I'm hoping a controller adds to the game feel of the final product in ways a potentiometer can't, which is ironic since controllers are just multiple potentiometers embedded inside a bigger multi-axis button. Item one, on my resource page, includes an article explaining how to implement an XY Joystick. I also ordered a few controllers to get the ground running as soon as possible, in case I'm underestimating the challenges they pose. Otherwise, the class repository and in-class examples are sufficient resources for my other hardware questions.
- While a big asterisk, I researched 3D printed joystick cases, see resource page item two, and collected some sample designs from printables.com. I also have some experience using Autodesk Fusion 360. If and when the software elements of the project are completed, I'll fabricate a 3D joystick using the fabrication resources already available on campus.

Software:

This project is centered around a digital interface designed and built in Processing. The eventually Processing sketch is would be a 2D arcade-style game loosely inspired by Pac-Man; see resource page item three. Pac-Man has two warp-around doors in the center of the

gameboard where Pac-Man disappears through the door to the left and emerges through the door to the right.

The doors in “Catch” center this disappearing feature on the sidelines of Pac-Man.

Challenges:

- **Limiting Player Movement:**

The current game sketch/draft includes a rectangular black box visually indicating the boundaries of the gameboard. Currently, each player’s movement in either the X or Y direction adds three 20-pixel steps to the player in that direction. When the player reaches the boundary, the player is teleported/redrawn back to the center of the board, while not my intended game-mechanic, it's a band-aid for my array out of bound issues resulting from serial port transmission between Processing and the ESP microcontroller.

- **Teleporting the Player:**

The constant redrawing of the background in Processing’s draw() function is posing a difficulty to moving the player across the doors. Simultaneously, not redrawing the background would keep every player movement on the screen drawing a snake like character.

- **Randomizing the Doors:**

The challenges with this portion aren’t yet fully apparent because I haven’t had as much implementation practice. Currently, I have a function that generate random integer within the bounds of the gameboard and appends them into two arrays, one for the X-axis and the other for the Y-axis.

Timeline For Project Completion:

- Wednesday (Apr. 16th) – Proposal Draft and Precedent Research
- Wednesday (Apr. 23rd) – WIP #1 (Goal: Software Challenge 1 & 2 Completed)
- Wednesday (Apr. 30th) – WIP #2 (Goal: Software Challenge 3 & Hardware Design)
- Wednesday (May 7th) – WIP #3 (Software Playtest & Hardware Prototype)
- Wednesday (May 14th) – Prototype (Software and Hardware Finalized)
- Wednesday (May 21th) – Final (Presentations & Final Deliverables)

Resources

“ESP32 - Joystick.” ESP32 Tutorial, <https://esp32io.com/tutorials/esp32-joystick>. Accessed 8 Apr. 2025.

“Joystick Case by PrintSideways | Download Free STL Model.” Printables.Com, <https://www.printables.com/model/608603-joystick-case>. Accessed 17 Apr. 2025.

PACMAN, Play Pac-Man Game Online FREE! <https://www.pacman1.net/>. Accessed 12 Apr. 2025.

“Screwless* Arduino and Mini-Breadboard Case by ClassicGamer296 | Download Free STL.” *Printables.Com*, <https://www.printables.com/model/957442-screwless-arduino-and-mini-breadboard-case>. Accessed 8 Apr. 2025.

“Arduino Nano Case with GPIO Access for Breadboard by Abhiram Rachamadugu | Download Free STL Model.” Printables.Com, <https://www.printables.com/model/93569-arduino-nano-case-with-gpio-access-for-breadboard>. Accessed 8 Apr. 2025.

“Housing for Breadboard Experimental Board by Thommyfix | Download Free STL Model.” Printables.Com, <https://www.printables.com/model/418638-housing-for-breadboard-experimental-board>. Accessed 8 Apr. 2025.

“Lilygo T-ETH ELite Breadboard Case by Pixelwave | Download Free STL Model.” Printables.Com, <https://www.printables.com/model/1035089-lilygo-t-eth-elite-breadboard-case>. Accessed 8 Apr. 2025.