

Report Details:

Timeframe: 2/13/2026 - 2/25/2026

Group number: 21 (*sdmay26-21*)

Project Title: A Smart Aquatic Ecosystem

Client &/Advisor: Md Maruf Ahamed

Team Members/Role:

Griffin Urban — Frontend Developer

Daniel Pender — Hardware

Aden Koziol — AI Population Tracking

Ryan Holden — Backend/Frontend Developer

Marina Mannan — Embedded Systems Engineer

Carson Irving — Backend/Frontend/AI

Max Purvis — Hardware

Weekly Summary

The team successfully completed the assembly of the aquarium and initial fish stocking while refining the hardware housing and 3D-printed components. On the technical side, the group optimized the camera's field of view and lighting, implemented a local AI API for better security, and integrated sensors to stream real-time environmental data to the server. Software development progressed with the completion of controller documentation and device pairing protocols, and the frontend added an account management page.

Past Week Accomplishments

- **Aden:** Helped to set up the tank and get the fish. Did some testing with the camera to determine the best angle and distance from the tank for the mount. Finished developing the testing tool.
- **Marina:** Printed a bigger Arduino enclosure, the camera mount prototype, and the feeder designed by Danny. Noted flaws with the fit and placement of the mount, and planned for modifications. Also discussed the angle and overall structural stability of the mount, as well as other potential 3D-printed components.
- **Carson:** Helped set up the tank and get the fish. Refined tool to test the Arduino camera locally to adjust the lens and test distances. Ordered a new lens from ETG to get the entire tank in one frame, as well as other things. Changed the Python AI API to use a local network port so the methods it uses don't need authentication, but are also not exposed to the internet. Added a few basic helper methods to the image class so Aden could develop his tool. Discussed light/camera/decoration placement with Aden and Max. I was also able to finish the device pairing and device JWT token implementation, and get a basic setup for the Arduino done.
- **Max:** Helped set up the tank and get the fish. Made a wire harness for the camera, then worked with Carson and Aden to test different angles and distances for the camera, as well as light placement. Got the larger Arduino enclosure from Marina and discussed other 3D-printed aspects of the project. Set up a circuit for a small fan that we might use to cool

the camera. Updated calibration parameters and set up the pH, dissolved oxygen, and temperature sensors in the tank to get some real data sent to the server.

- **Danny:** I completed the CAD files for both the fish food holder and the lid attachment for the servo motor. Tested the fits and alignment in the software. I worked with Marina to double-check initial design. Marina printed the design.
- **Ryan:** I finished the documentation for the controller classes that I began last week.
- **Griffin:** I worked on completing the frontend software diagram and creating the accounts page feature that allows a user to edit their account information and log out. Beyond that, I looked into mobile support because the mobile web app does not display nicely.

Individual Contributions

<u>NAME</u>	<u>Individual Contributions</u> (Quick list of contributions. This should be short.)	<u>Hours this week</u>	<u>HOURS cumulative</u>
Aden	• Camera testing for the mount • Finished testing the tool	8	25
Marina	• Printed revised Arduino enclosure, camera mount prototype, and fish feeder • Discussed alterations and sensor arrangement	8	24
Carson	• Helped set up the tank and get the fish • Made a new ETG order for a new lens and other stuff • Changed Python API to use a local port to avoid needing auth while being secure • Basic helper methods in the image controller + • Device pairing code / JWT	9	26
Max	• Helped set up the tank and get the fish • Wire Harness • Camera testing for the mount • Set up a cooling fan • Tested sensors in the tank	8	20
Danny	• Completed the initial prototype for the feeder • Discuss changes and improvements to the initial design	9	23
Ryan	• Completed controller class documentation	6	18
Griffin	• Finished software frontend diagram • Added Account page with logout feature	6	19

Pending Issues

- N/A

Comments and Extended Discussion

- N/A

Plans for Upcoming Week

- **Aden:** Start researching new camera solutions. Start implementing background subtraction into the computer vision model.
- **Marina:** Redesign the camera mount for the new lens and print it. Look into sensor holder mechanisms and deliver the feeder.
- **Carson:** If the new lens gets here need to finish deciding placement. Need to fix image streaming on Arduino to support higher resolutions while meeting memory constraints. Arduino logging code and organizing code for easier compatibility and use.
- **Max:** Figure out how to get the pH and dissolved oxygen sensors to work correctly when used at the same time. We placed an order for some tank supplies and decorations to help reduce the fish's stress, so we're hoping they arrive and we can get them in the tank.
- **Danny:** Get the feeder hooked up to the servo for initial implementation of the design. Note all issues that arise, and revise the design as needed.
- **Ryan:** Design the user interface for the settings page.
- **Griffin:** Continue research into how to make the web app mobile-friendly, work with Carson and Ryan to edit user information, and work on refreshing the JWT token.

Summary of Weekly Advisor Meeting

N/A