

Con-Sea-Erge

Automatic Fish Feeder and Monitor

OPERATION MANUAL

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Table of Contents

Web Application	3
Accessing the Application.....	3
Account Creation and Logging In.....	3
Setting a Feeding Schedule.....	6
Manual Feeding.....	8
Changing Tank Settings.....	9
Backend	11
Accessing Firebase.....	11
Realtime Database.....	11
User Logins.....	15
Enclosure	17
Components.....	17
Tools Required for Assembly.....	18
Assembly Process.....	18

Web Application

The web application is the user’s portal for managing tanks and feeding devices. Once an account is created, users have the ability to view up-to-date pH and temperature readings from each tank as well as the ability to set feeding schedules for each day of the week.

Accessing the Application

The application is deployed on Google Firebase. In order to access the application, head to <https://con-sea-erge.web.app/> in any browser (preferably mobile).

Account Creation and Logging In

1. Register for an account by selecting “Sign Up” (Skip to #4, if you already have an account).

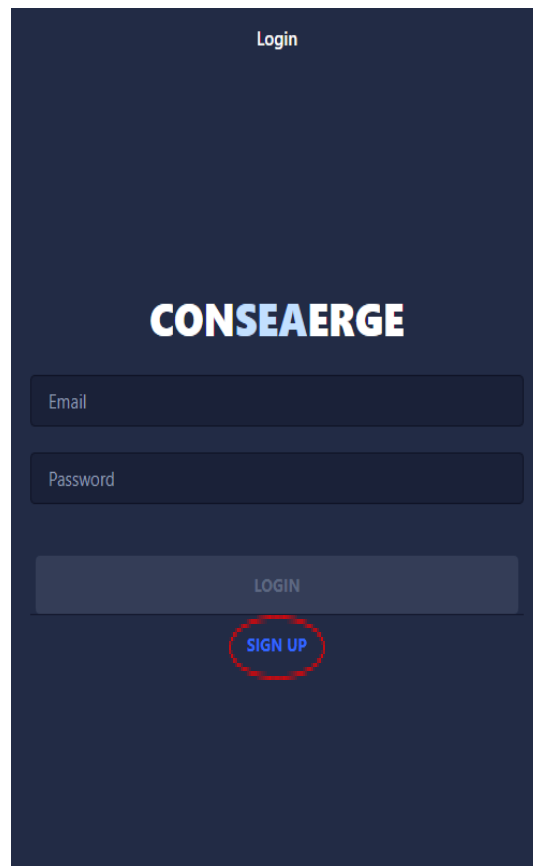


Figure 1: Start-Up Screen with Login and Sign Up Prompts

2. Enter a username, unique email address, and password (at least 6 characters long). Then press "Create Account" to register for an account.

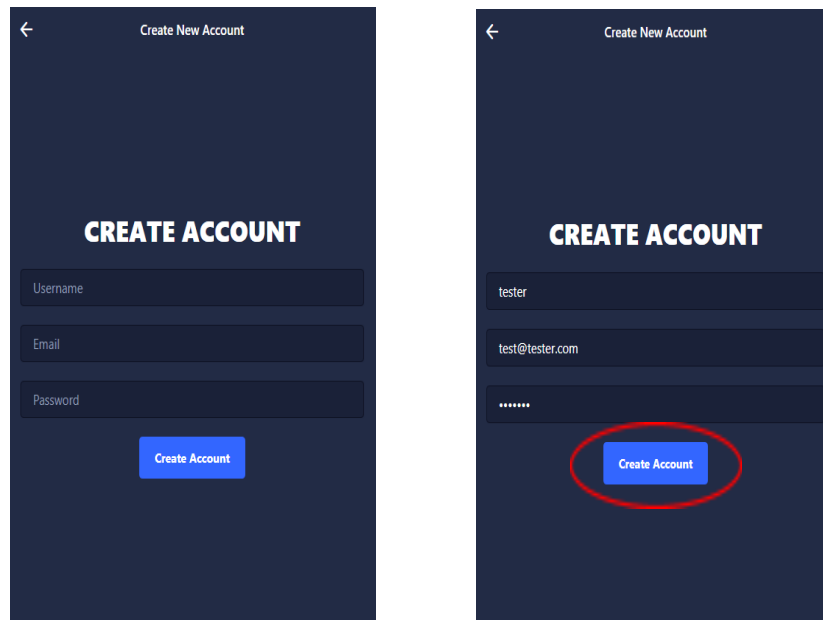


Figure 2: Create New Account Page

3. Login to the application with your registered account using your email and password.

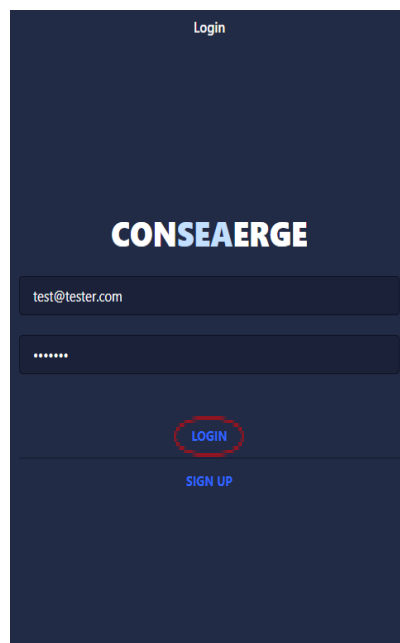


Figure 3: Login Page

4. After successfully logging in, your home screen will be displayed. You will be able to view all of the tanks that you manage along with real-time information for each tank. To view a specific tank individually, simply click on it. A sample home screen and tank page are shown in *Figure 4* below.

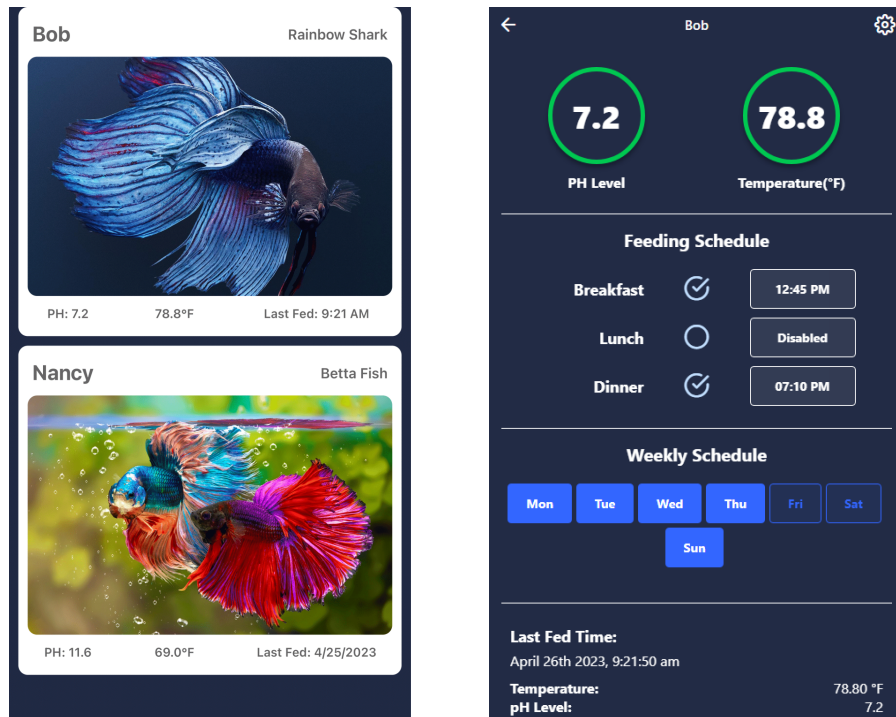


Figure 4: User Home Screen and Tank Page

Setting a Feeding Schedule

1. To set a feed time, select the button corresponding to the meal that you would like to change (i.e: select Breakfast, Lunch, or Dinner). Then, select the time that you would like the feeding to occur and click OK to save the schedule.
2. You can switch to a more simplified time entry by clicking on the keyboard icon in the lower left corner of the time selector screen.
 - **Note:** All feeding times are in Central Standard Time

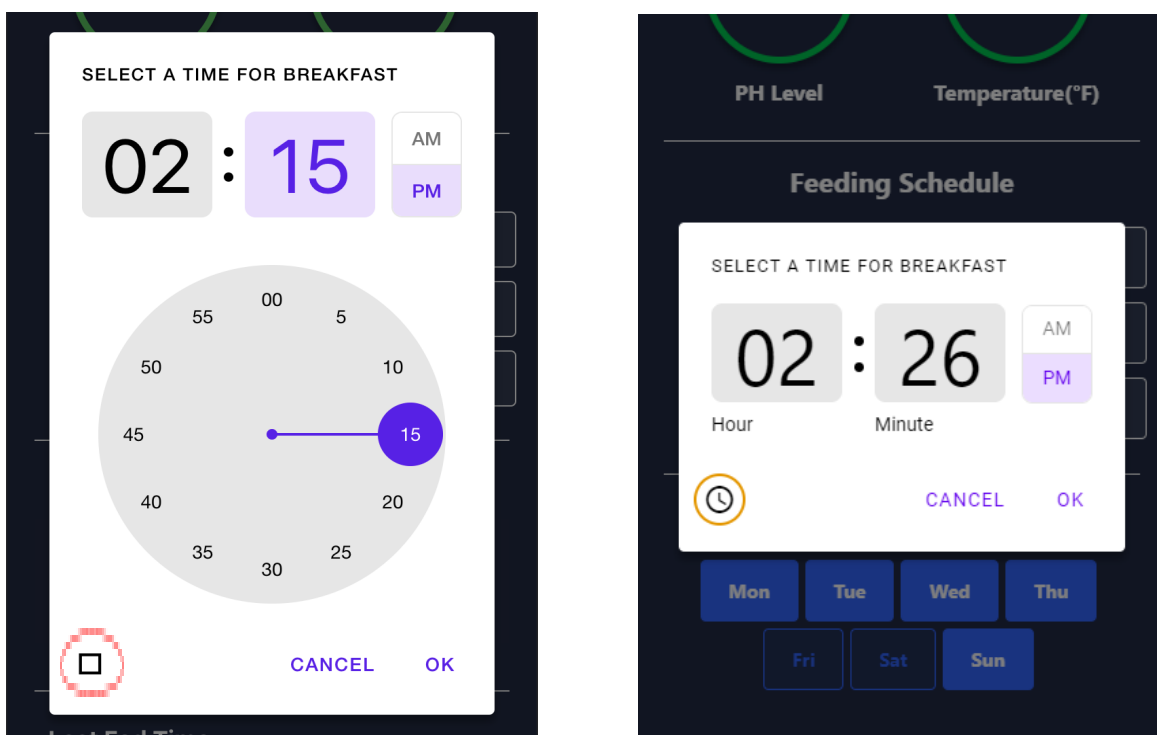


Figure 5: Setting a New Breakfast Time in Various Formats

- To disable a feeding time, click on the circle check box next to the corresponding meal time to enable or disable it. The feeding time field will change to correspond with the status of each feeding.

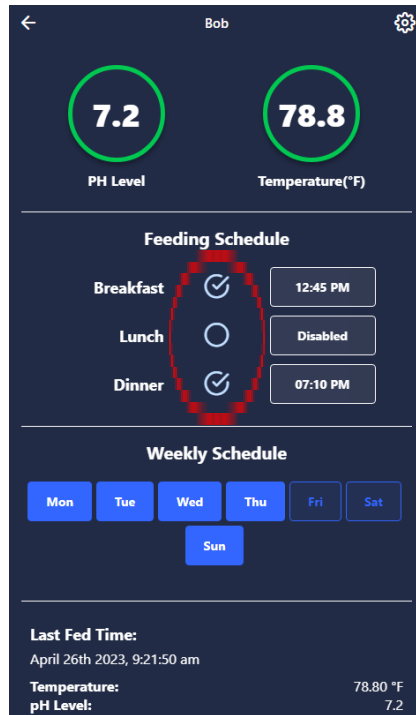


Figure 6: Enabling and Disabling Feeding Times

- To select the days in which you would like feedings to occur, toggle the buttons labeled **Mon - Sun**. If a button is colored blue, feedings will occur according to your set schedule on that day. Otherwise, if a button is colored black, automatic feedings will not occur on that day.

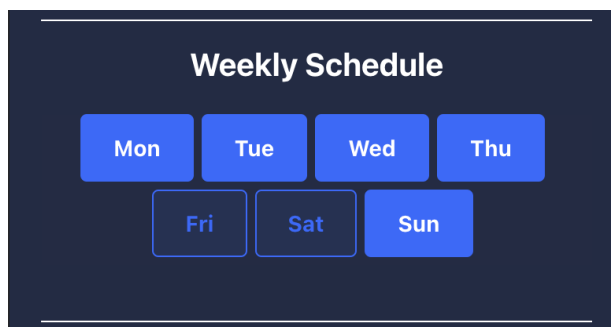


Figure 7: Enabling and Disabling Feedings for Individual Days

Manual Feeding

1. To trigger a manual feeding, click on the settings gear icon in the top right corner of the tank details page
2. Click on the Manual Feed button to issue a command to feed the fish regardless of feeding schedule.

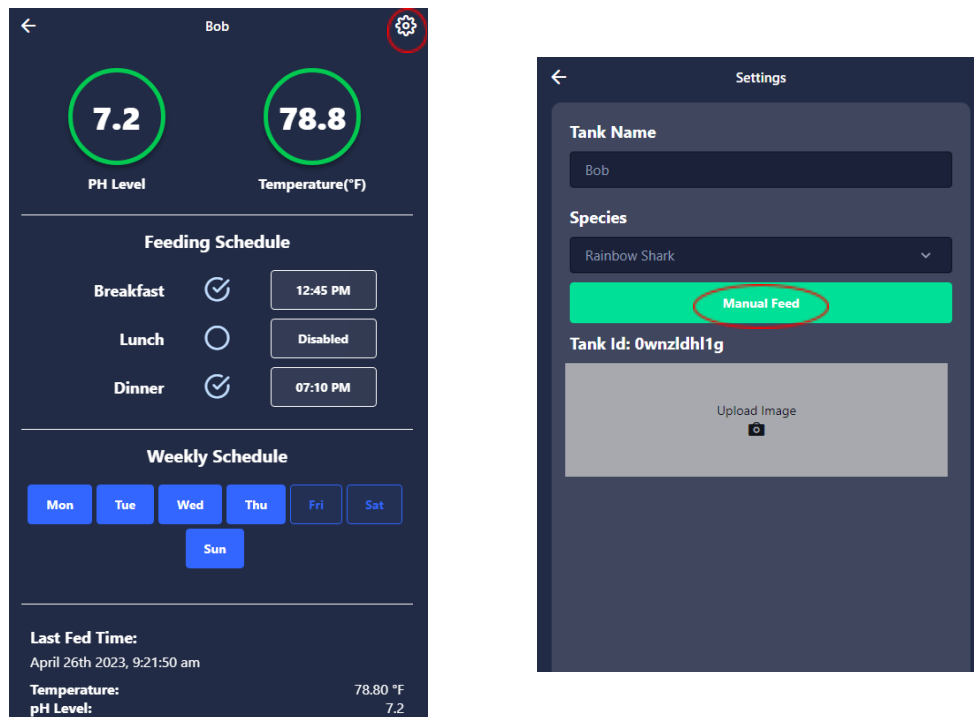


Figure 8: Manual Feeding

Changing Tank Settings

1. Changing Tank Name
 - a. Navigate to the Settings Menu and fill out the field labeled "Tank Name". This will change the name of the corresponding tank within the application.

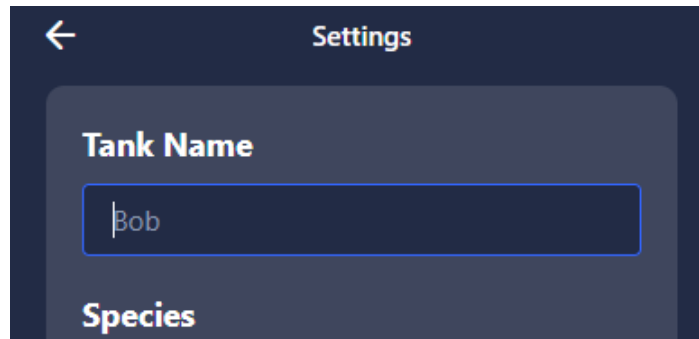


Figure 9: Changing Tank Name

2. Selecting Fish Species
 - a. In the Settings Menu, click on the dropdown icon in the field labeled "Species". Select the desired species from the list displayed. This will update the species of the fish in the corresponding tank within the application.

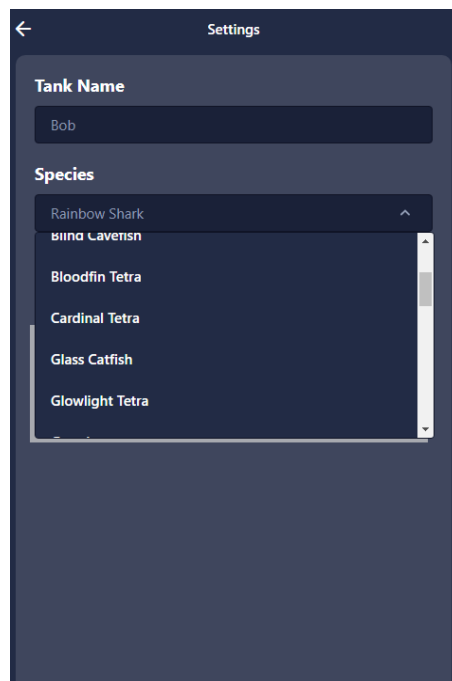


Figure 10: Changing Fish Species

3. Changing Images on Tank Card

- a. In the Settings Menu, click on the gray box labeled "Upload Image". Then, select the image that you would like to use for the Tank Card.
- b. Confirm or discard your changes to save the image or start over.

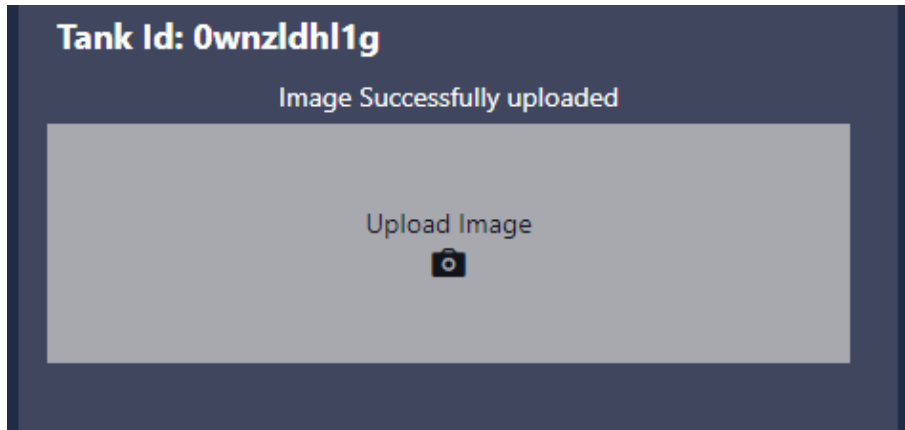


Figure 11: Changing Tank Card Image

- c. View the updated image on the corresponding Tank Card on your home page.



Figure 12: Updated Tank Card on User Home Page

Backend

Accessing Firebase

Our team has provided an account to access the firebase account with. This account should have full administrative privileges and is for the clients to manage the application at their discretion. The login is as follows:

Login: conseaerge@gmail.com

Password: CampOrg@ccountR0cks!

With this account you should have full access to the database. From here it is recommended to do a couple things

1. Make sure you can get into the account and can see the firebase console
2. Change the password to the account for security purposes
3. Add additional maintainers to the Firebase (if desired)
 - a. Worth mentioning that iastate.edu domains don't play well with firebase since the transition to outlook so you may need a separate account for use

Realtime Database

The Firebase backend is the location in which all of the data for the application is stored and accessed. The console can be accessed via the following link:

<https://console.firebase.google.com/project/con-sea-erge/overview> . If there is ever a problem with the data being stored, the database can be reset manually by going into the Realtime Database within Firebase and adjusting the values. There are only two tanks within the database that the clients are able to manage. The IDs for these tanks are **Ownzldhl1q** and **ulxgmpj751**.

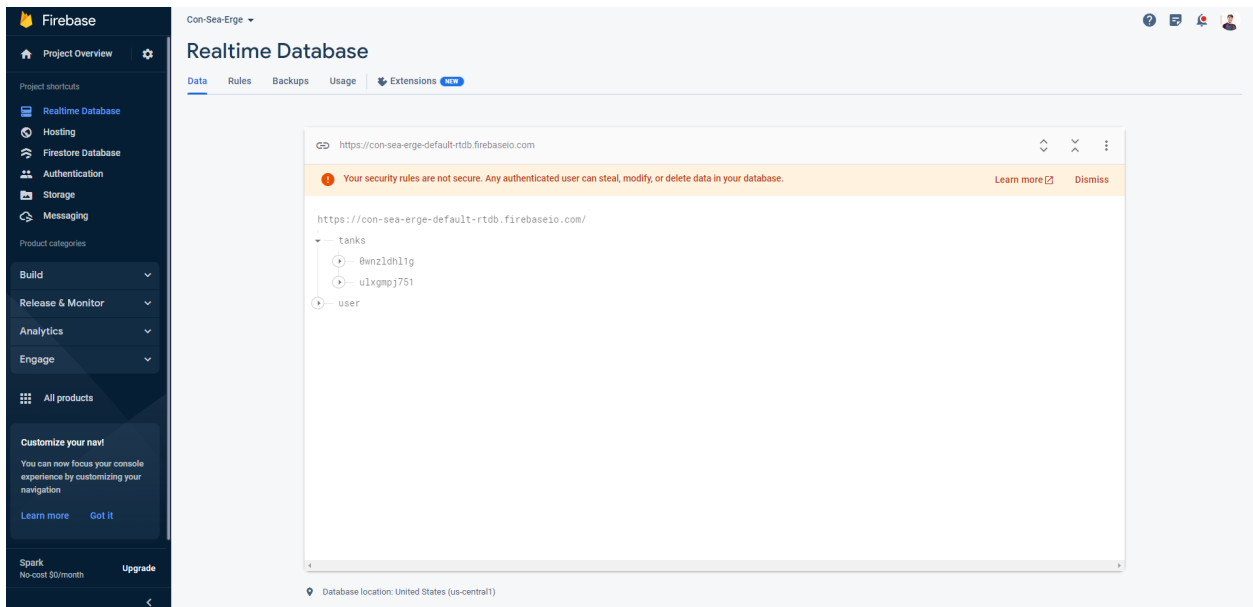


Figure 13: Firebase Backend Realtime Database

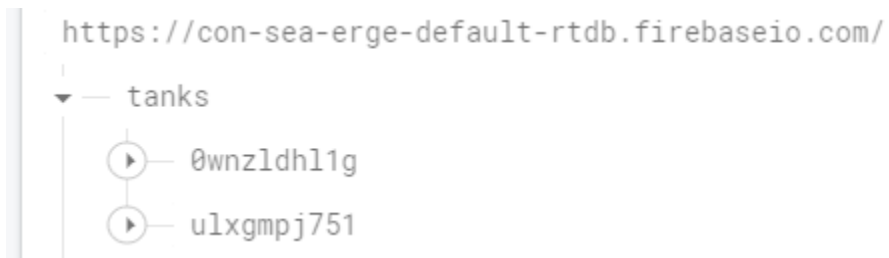


Figure 14: Tank IDs Managed by Users

- Tank information within the Realtime Database appears in the following structure:

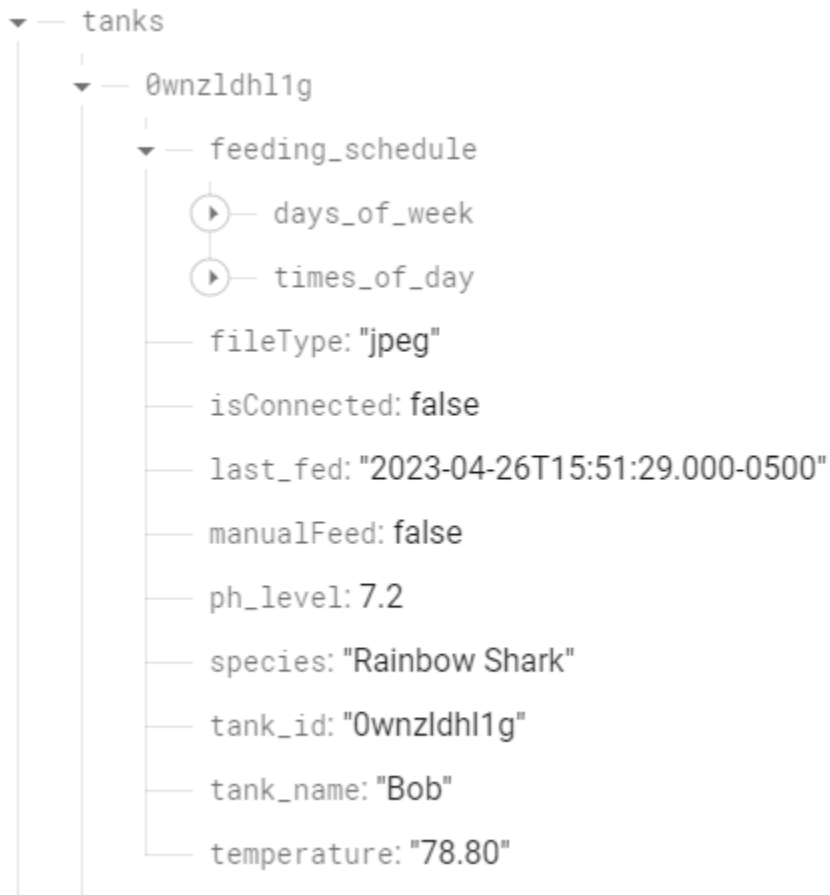


Figure 15: Expansion of Tank Data

- **Note:** Deleting any of these values will result in errors when attempting to access and use the application.

- Each tank has a feeding schedule stored under "days_of_week". Each day of the week stores a value that corresponds to whether or not the tank will run the feeding schedule on that day. A value of true corresponds to feedings occurring according to schedule on that day, and a value of false corresponds to no scheduled feedings occurring on that day.

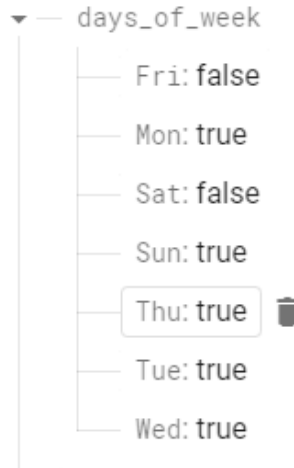


Figure 16: Daily Feeding Options

- Each tank also has three possible feeding times stored under "times_of_day". Under each feeding time (Breakfast, Lunch, and Dinner), there are two fields. The "isEnabled" field represents whether or not a feeding will occur for each meal time (true=feeding will occur, false=feeding will not occur), and the "time" field represents the time in which the corresponding feeding will occur if it is enabled. Times are stored in military time without a ":", so 1245 would represent 12:45PM CST and 1800 would represent 6:00 PM CST.

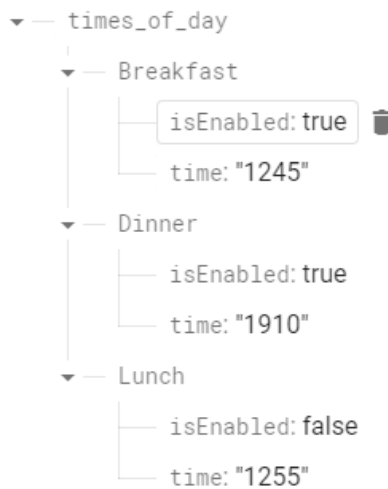


Figure 17: Scheduled Feeding Times

User Logins

- Login information can be reset within the Google Firebase backend. This can be useful in the case that a user's password is forgotten. You can do this by logging into the Firebase console and navigating to Authentication.

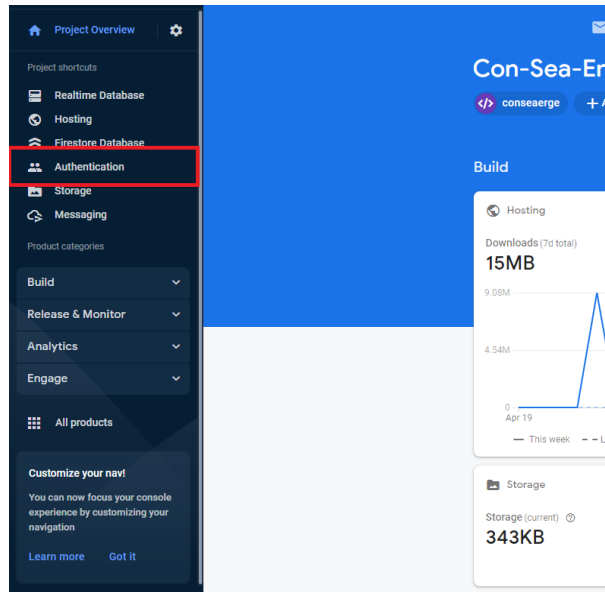


Figure 18: Authentication Tab within Google Firebase

- Then, search through the list of users and find the email of the account that you are looking for.

test@testing.com	✉	Mar 22, 2023	Mar 22, 2023	a5UI0HhBNhM9U9yloUebutOCHzq2
drwdodson@gmail.com	✉	Mar 21, 2023	Apr 26, 2023	eO3GRnDbgJgtzBHsR7qzWATEM...
test@test.com	✉	Mar 21, 2023	Mar 21, 2023	y3S5dE0ZVLd8VSCKEkvW4Xvq2B...
jvandrie@iastate.edu	✉	Mar 7, 2023	Apr 19, 2023	NPo4MwBRbVdfRYhxOf8d1tcNdkf2
ethancpeterson5@gmail.c...	✉	Nov 28, 2022		IsV8I72LDUP2gtqD6F1qSdlZmL43

Figure 19: List of Users Under Authentication Tab

- You may then either choose to delete the account and start over with the same email or ask to send a reset password email, which will be sent to the corresponding email address. The owner of that email can then update their password.

drwdodson@gmail.com	✉	Mar 21, 2023	Apr 26, 2023	e03GRnDbgJgtzBHsR7qzWATE	Reset password
test@test.com	✉	Mar 21, 2023	Mar 21, 2023	y3S5dE0ZVLd8VSCKEkvW4Xvq	Disable account
jvandrie@iastate.edu	✉	Mar 7, 2023	Apr 19, 2023	NPo4MwBRbVdfRYhxOf8d1tcNdkf2	Delete account
ethancpeterson5@gmail.c...	✉	Nov 28, 2022		IsV8I72LDUP2gtqD6F1qSdlZmL43	

Figure 20: Options for Resetting Password

- If a user account is deleted in the authentication section of Firebase, it will also be deleted in the Realtime Database section, as the specific UID is linked to an entry in the database for user information.

drwdodson@gmail.com	✉	Mar 21, 2023	Apr 26, 2023	e03GRnDbgJgtzBHsR7qzWATEM...	📄 ⋮
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user
├── 4KzyxONGdhe0mOfHCh88xj0EiID2
├── L8nMC3uBBcgjpSaio7IVxI02OMG3
├── NPo4MwBRbVdfRYhxOf8d1tcNdkf2
├── NmnPWQAR0uSRduQyfC0Hn9FNpYo2
├── VbsiDB2jwAgieMY9VBaBjpG09eI3
├── XfbTh1PRWXXKyYi9ybKcgpdkgTP2
├── awMQu3p9tqTaT6F54xBrNBcNXLU2
├── e03GRnDbgJgtzBHsR7qzWATEM4J3
│   ├── email: "drwdodson@gmail.com"
│   ├── tanks
│   ├── uid: "e03GRnDbgJgtzBHsR7qzWATEM4J3"
│   └── username: "drwdodson"
└── iVoixTZd7VfFM5q3DsQQRmyA4Ke2
  
```

Figure 21: UID in Authentication Tab and Realtime Database

Enclosure

Components

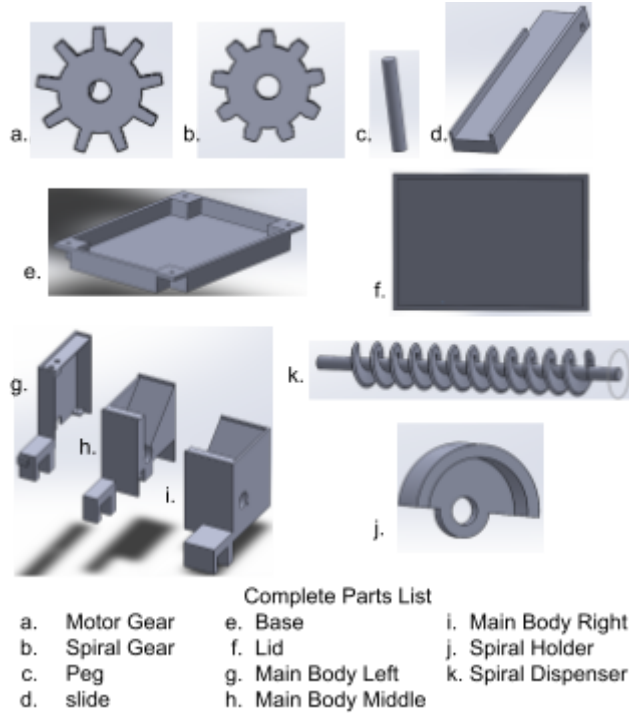


Figure 22: Complete Parts List

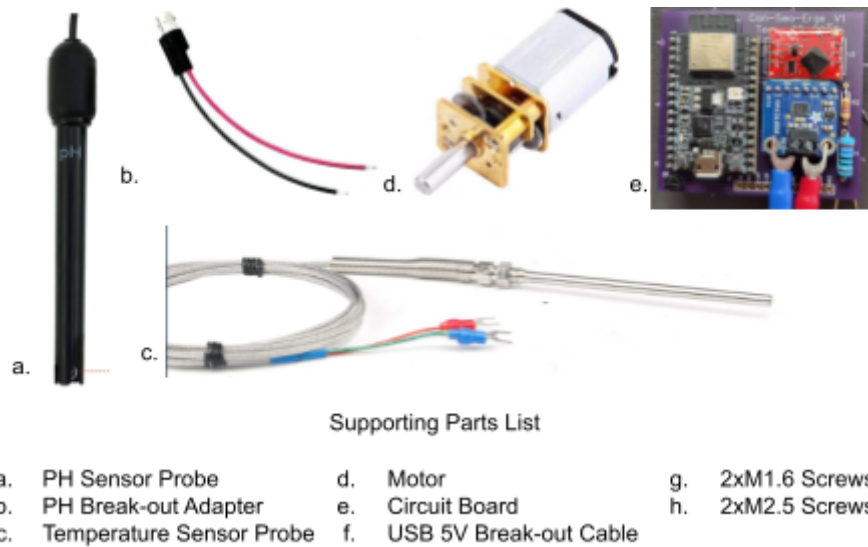


Figure 23: Supporting Parts List

Tools Required for Assembly

- Mini Flat-Head Screwdriver
- Super Glue
- Soldering Iron



Figure 24: Tools Required for Assembly

Assembly Process

1. Soldering

- Locate the J1 Header.
- Solder the POSITIVE wire of the USB Break-out Cable to the 5v VIA on the Header. The NEGATIVE wire to the GND VIA.
- Next, solder the NEGATIVE wire of the motor to the MT+ VIA. The POSITIVE wire to the MT- VIA.
- Solder the POSITIVE wire of the PH Sensor Adapter to the PRB VIA. The NEGATIVE wire to the PGND VIA.



Figure 25: Soldering Process

2. Installing the Motor

- a. Locate the Main Body Middle part of the enclosure.
- b. Place the motor in the motor carriage, in the bottom section of the enclosure part, so that the shaft of the motor is poking out the side of the enclosure and the screw holes are aligned with the mount.
- c. Use the M1.6 Screws to secure the motor to the enclosure.

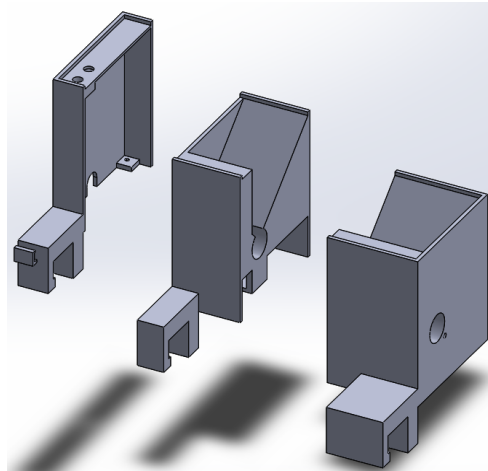


Figure 26: Main Body Model Showing Motor Location

3. Installing the Spiral Dispenser

- a. Place the Motor Gear on the shaft of the motor.
- b. Put the shorter end of the Spiral Dispenser through the shaft hole on the enclosure by sliding the Spiral Dispenser all the way through the device.
- c. Apply some super glue to the inside of the Spiral Gear and place it on the protruding shaft of the Spiral Dispenser so that it meshes with the Motor Gear.
- d. Ensure the Spiral Dispenser spins and let the super glue dry.



Figure 27: Spiral Dispenser

4. Main Assembly

- a. Place super glue on each face of the components that will contact one another.
- b. Slide the Main Body Right section of the enclosure onto the spiral dispenser to contact the glue on the Main Body Middle section. Be sure the sides and top of the enclosure line up.
- c. Attach the Main Body Left section to the other side of the Middle section of the enclosure, lining up the top and sides.
- d. Place the device in a steady location and let dry completely.

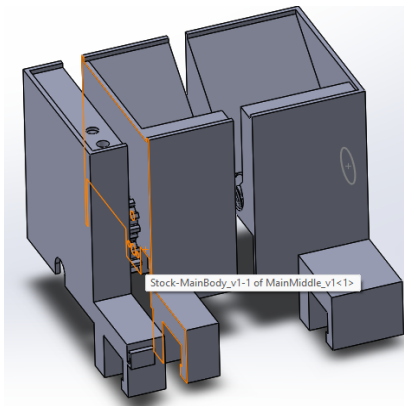


Figure 28: Assembly of Main Components

5. Slide and Spiral Holder

- a. Attach, with super glue, the Spiral Holder to the other side of the Spiral Dispenser's shaft. Be sure this part is as shown in the picture as this is where the food will be dispensed.
- b. Apply super glue to one end of the Peg, and insert it into the small hole on the enclosure to the right of the food output hole.
- c. Place the slide on the peg and position it as necessary.

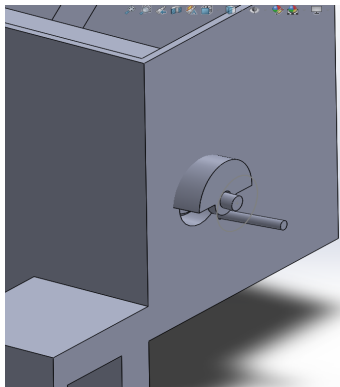


Figure 29: Slide and Spiral Holder

6. Attaching the Base

- a. Tuck all internal wires and circuit board tightly inside the bottom of the device.
- b. Ensure that all external wires are routed through the opening on the Main Body Left section of the enclosure.
- c. Attach the base to the enclosure with the 4xM2.5 screws in each of the four bottom corners of the device.

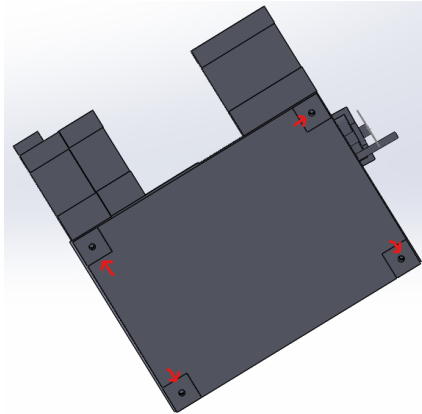


Figure 30: Base Attachment

7. Mounting the Enclosure

- a. Remove the lid of the tank.
- b. Place the enclosure on the edge of the tank and adjust the slide to the correct position.
- c. Replace the lid of the tank and test the device using the web application.