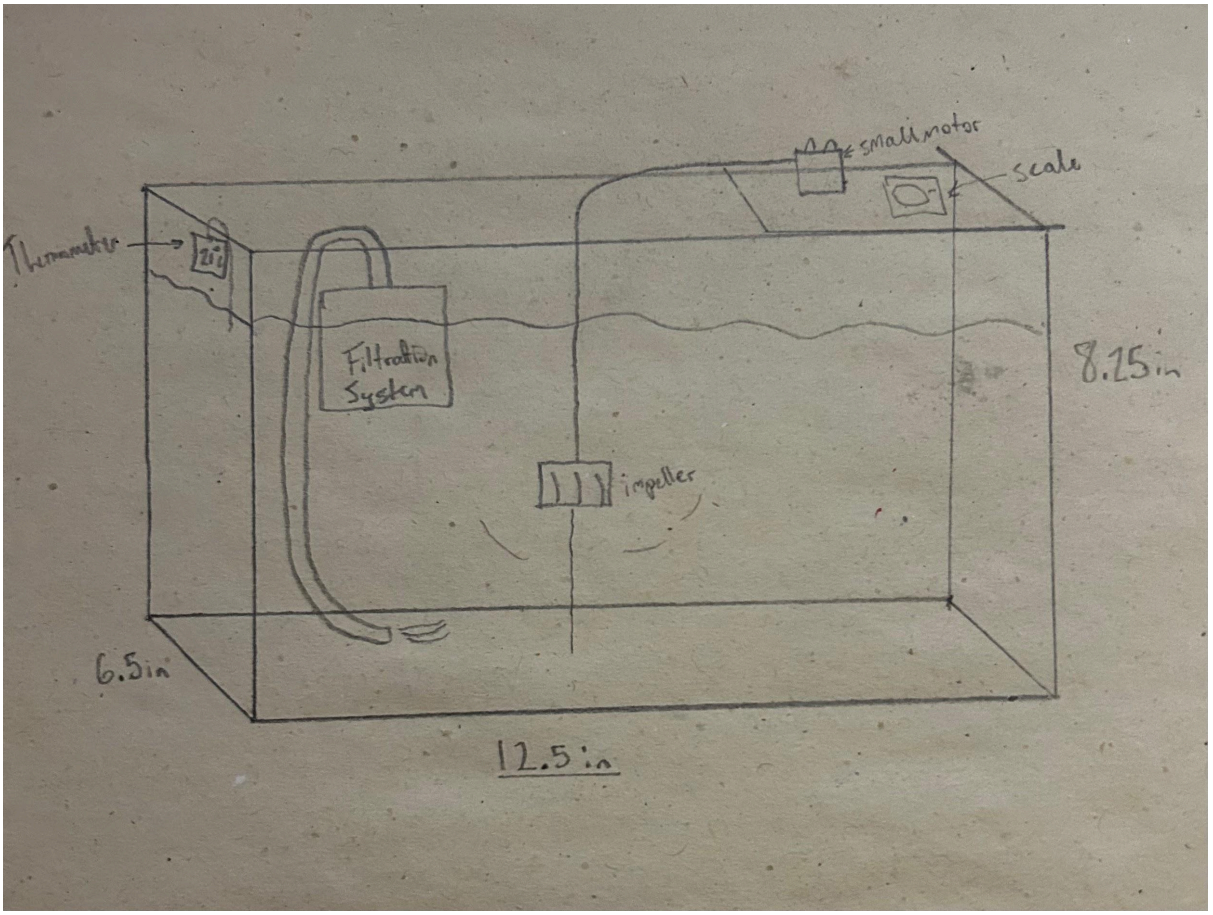
Dream Team
Group 8
Deliverable E
Due Feb 25th,2024

Project Plan and Cost Estimate

1) The client meeting told the group that we should go with design 2. For ease of design, we decided to use a three-blade propeller instead of the impeller, as the design of the impeller is rather intricate and could fail during usage.



https://www.petsmart.ca/fish/tanks-aquariums-and-nets/aquariums/top-fin-open-glass-aquarium-5318197.html?gad_source=1&gclid=CjwKCAiA2pyuBhBKEiwApLaIOw7S7ItZk9jQCMQAao1a8jqfJDyJ1RDtf_FNflOMyIN90l4vU3a2iBoCjkIQAvD_BwE&gclsrc=aw.ds
(FISHTANK)
https://cad.onshape.com/documents/bdc4690ea852c3f631a1828d/w/451bac945ec12a1830017c82/e/279f7b0648cb6c98c802d43f?renderMode=0&uiState=65bd4ba9fc66723b907e03c9
(THREE-BLADE PROPELLER)

https://learn.adafruit.com/assets/16734
(ARDUINO BASED MOTOR, COMES WITH WIRES)
https://www.youtube.com/watch?v=XrJ_zLWFGFw
(video showing the coding process of a DC motor with the Arduino boards)
https://www.amazon.ca/Finnex-PF-7-Aquarium-Power-Filter/dp/B082JJJL75/ref=asc_df_B082JJJL75/?tag=googleshopc0c-20&linkCode=df0&hvadid=459389502145&hvpos=&hvnetw=g&hvrand=13125373597523261688&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9000668&hvtargid=pla-1012268577294&psc=1&mcid=3f700aefdc7f382e9df3764f4da84173
(FISH TANK FILTER)
https://www.canadiantire.ca/en/pdp/starfrit-digital-kitchen-scale-5-kg-0424076p.0424076.html?gclid=Cj0KCQiAwvKtBhDrARIsAJj-kTixyVT72BDXJzLUSdQ8Tv-sdHnMYjb6FjFhqd01NxRGVQWNVkKd0NUaAuMpEALw_wcB&gclsrc=aw.ds#store=174
(SCALE)
https://www.amazon.ca/Neptonion-Thermometer-LCD-Digital-Temperature-Reptiles-Like/dp/B07RBPV8Q4/ref=sr_1_1_sspa?crid=3F9RBWSQQ50J8&keywords=fish+tank+thermometer&qid=1706904418&sprefix=fish+tank+the%2Caps%2C221&sr=8-1-spons&sp_csd=d2lkZ2V0TmFtZT1zcF9hdGY&psc=1
(TANK THERMOMETER)

2): List all the tasks that need to be completed, an estimated duration for each task

1) Confirm the prototype that the client suggested and include any details that the client suggested for the existing prototype finalizing the idea of the sketch.
   Duration: 30 minutes hour: Feb 16, 2024 All group members are to be responsible
2) Create a list of parts needed for the ideal prototype and a spreadsheet with all costs and items to be approved by the TA.
   Duration: 30 minutes to 45 minutes, Feb 16, 2024 All group members are to be responsible

3) Once the items are confirmed sample prototypes can take place using smaller 3-D printed items on a much smaller scale to test out multiple prototypes with minimal budget constraints.
   Duration: Unknown Need TA's approval to continue Meeting date: 3 pm every Saturday following approval, All group members are to be responsible

4) Create the first mini prototype using household appliances, a small Tupperware container, and a mini motor with a fan.
   Duration: 30 minutes -2 hours at most, Meeting date during March 1st, 2024

All group members are to be responsible

5) Develop a more serious prototype for the second prototype that will resemble the ideal prototype including an Arduino and a controlled 3-D printed blade as well.
   Duration: unknown, Meeting date: March 8th, 2024
   All group members are to be responsible

6) Use results from the first two prototypes and work on developing a finalized prototype with feedback from the first two results and start working with the first case scenario(regular distilled water).
   Duration: Unkown, Meeting time: March 15th, 2024
   All group members are to be responsible

7) The next test will be with salt water once the first final prototype testing is done with results recorded if all goes smoothly.
   Duration: Unknown, Meeting date TBD
   All group members are to be responsible

8) The last test will be after scenario number 2 is complete with recorded results, the final prototype will be used with sand water as the final method of erosion testing.
   Duration: Unknown, Meeting date TBD
   All group members are to be responsible

9) Finally, any last changes or modifications will take place proceeding with these tests and extended testing may take place if the ideal 3 testing environments are not sufficient.
   Duration: Unknown, Meeting date TBD
   All group members are to be responsible

List of the significant project risks

Only 2 significant risks

Electricity associated with water

Risk: Motor falling into the water creating a dangerous environment.
Mitigation: Firmly mount the motor into place with the potential addition of a mesh net above the tank as a last-resort safety feature.

Water spill

Risk: Tank opening from sediments in the water or external factors
Mitigation: buy a sturdy tank minimize sharp objects around the prototype area and take necessary precautions beforehand with wipes available at and.

Risk: Water overflowing and spilling over the edges of the water tank
Mitigation: Ensure insulation of the tank with a hardtop cover that insulates the water from splashing when the prototype is set and running.

3. Materials needed

Prototype 1 - Prototype 1.xlsx
Prototype 2 - Prototype 2.xlsx
Prototype 3 - Prototype 3.xlsx

4. List of Materials Needed for Prototypes and Final

Prototype 1:

- Small tupperware container
- ~1cm diameter 3d printed impeller
- Small motor
- Battery
- Water
- Tape

Prototype 2:

- Bucket
- Arduino Motor
- ~5cm diameter 3d printed impeller
- Arduino UNO board
- Arduino software

- Thermometer
- Filtration System
- Salt
- Sand
- Water
- Laptop
- Duct tape
- Glue
- Breadboard

Prototype 3:

- Small fish tank or something similar
- ~5cm diameter 3d printed impeller
- Arduino Motor
- Arduino UNO board
- Thermometer
- Filtration System
- Removable lid
- Metal Rod
- Salt
- Sand
- Water
- Duct tape
- Glue
- Laptop
- Drain plug (Possibly)
- Kitchen scale
- Arduino Software
- Breadboard

5. Prototype Test Plan

1. The first prototype will be on a much smaller scale than the final design idea. The purpose of this prototype is to create a low-fidelity model of the final idea. This can be good to help us see any obvious flaws that we missed or can help us see if we are missing anything in the system or if we have any unnecessary parts.
    - Develop a small simple system to show the idea to others and help envision the design for ourselves
    - Look for any small or major things the group may have overlooked
    - Make sure we can properly implement the propellor in the system

Test ID	Objective	Description	Results	When

1	Test the ability of a propeller underwater	This test will involve testing a fan system in a low-fidelity model of our system.	N/A	March 1st, 2024
2	Look for Flaws	This test is simple, we will be looking for any holes in our early design and will be making sure the system is feasible with our given materials.	N/A	March 1st, 2024

2. The second prototype will be a much more developed system that will be used to test every part in depth and to make sure the system runs as normal. This will also be when the group tests different conditions, such as water type and different speeds, as the system will be advanced enough for this.
    - Have a more advanced system that will help finalize our design
    - Do major water testing to see which water type we will finalize on (Slurry, Mineral, Saltwater)
    - Erosion testing to make sure the system is functional
    - Checking for any final design flaws within the advanced system

Test ID	Objective	Description	Results	When
1	Continued testing of the propeller and motor	This test will be to make sure the propeller system established in the first prototype continues to work in the higher-fidelity system	N/A	March 8th, 2024
2	Water Testing	This test will help the group decide what type of water to use in the final system. With that being a slurry mix, saltwater, or mineral water	N/A	March 8th, 2024
3	Secondary Testing	This will be testing done on the smaller aspects of the design. Testing aspects like the thermometer, the filter,	N/A	March 8th, 2024

		and the scale.		
4	Look for Flaws	This will just simply be looking for any flaws in the system, and making an effort to revert these flaws.	N/A	March 8th, 2024