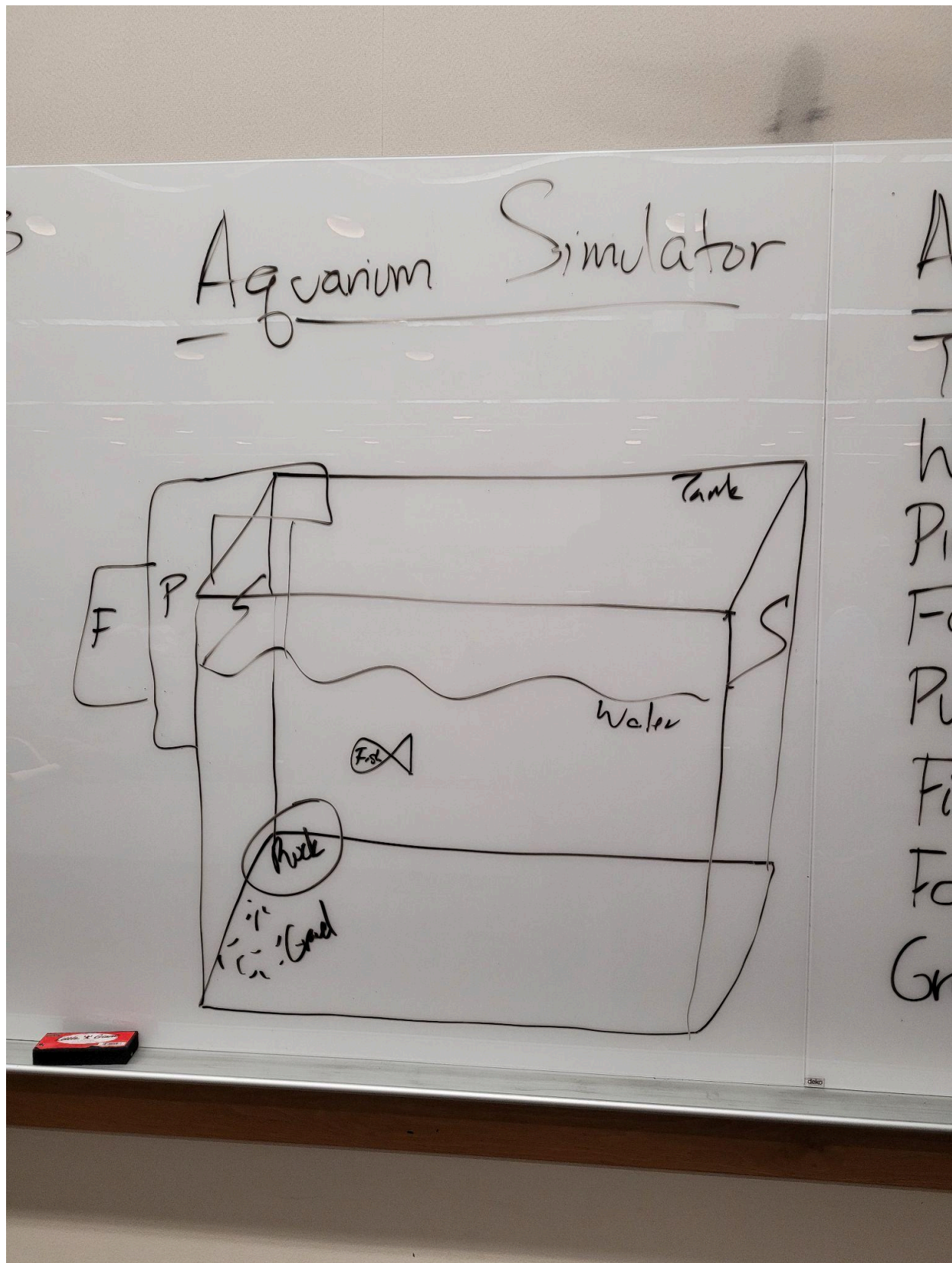


Sketch:



Actors:

Actors

Tank

Rocks

Water

Thermometer

Pirate Ship (Decorations)

Fish

Water sensor

Pump

Cleaning

Filter

System

Food

Gravel

Requirements and Specifications:

1. System
 - 1.1 The system shall continuously monitor water temperature. (ubiquitous)
 - 1.1.1 by using the thermometer
 - 1.2 When the water sensor detects a low water level, the system shall alert the user to add more water. (event)
 - 1.2.1 by notification system
 - 1.3 When the water sensor detects a low water level, the system shall alert the user to add more water. (event driven)
 - 1.3.1 by using the notification system
 - 1.4 While the water temperature is outside the safe range, the system shall activate the heater or cooling system to regulate it. (state driven)
 - 1.4.1 by switching on/off a boolean flag
 - 1.5 Where the automatic feeder is included, the system shall dispense food at scheduled intervals as configured by the user. (optional)
 - 1.5.1 by providing different time intervals and food amounts
 - 1.6 Where the AI-driven fish behavior model is included, the system shall simulate different species' interactions based on environmental conditions. (optional)
 - 1.6.1 by using some AI API tool (probs RL model)
 - 1.7 While there is food in the tank, while fish are eating the food, the system shall not provide more food into the tank (complex)
 - 1.7.1 by water sensor and monitoring fish behaviors
2. Filter
 - 2.1 The filter shall operate at all times to keep the water clean (ubiquitous)
 - 2.1.1 by removing debris and waste
 - 2.2 If the water level is critically low, the filter shall not operate. (unwanted)
 - 2.1.2 by using a sensor and boolean flag
 - 2.3 When the tank is full, while the filter is on, the filter shall switch on and off (complex)
 - 2.3.1 by sticking to a schedule
3. Food
 - 3.1 When a fish is fed, the uneaten food shall gradually decompose and affect water quality. (event driven)
 - 3.1.1 by using some decomposition algorithm (?)
4. Water
 - 4.1 While the pump is turned off, the water's movement shall cease, leading to reduced oxygen levels in the tank. (state driven)
 - 4.1.1 by deleting the water's movement strategy (foreshadow to lab 8)
5. Fish
 - 5.1 If the cleaning process is active, the fish shall not be able to interact with the decorations to prevent accidental disruptions. (unwanted)
 - 5.1.1 by limiting the fish's movement and interaction algorithm selections

UML:

