

# Gameplay Rules

## Main Idea

- The game revolves around a water treatment plant.
- There are two players:
  - Attacker: the goal is to hurt the treatment plant and if possible break the system.
  - Defender: the goal is to keep the water treatment plant functional.
- The game ends after a set amount of turns (Currently undecided but I think the code has it as 15 rounds).

## Water treatment plant

- Sensor: Reads information about waterflow and mineral concentration
- Pump: Propels water to the next module
- Filter: Toggles water purity in the water (0: unpurified; 1: purified). There are three different types of water purity (currently called purity1, purity2, and purity3 for simplicity).
- Tank: Holds a number of WaterObjects (need to implement maximum capacity)
- Reservoir: The end point for all water flow, the goal of the defender is to get as much water with the most purity in the reservoir as possible (may need to be revised with the point system).

## Defender

- The main way the defender defends the plant is using oracles/owls.
- An owl can look at any two objects (sensor, filter, or pump) at a time and by looking at them, it can make inferences on what's happening AT those two points (The player can use the information at the two points to infer the placement of an attack).
- The owls can set expected values on sensors. For example if there is no current attack on the system and an Owl (one of two hands/pointers) is looking at the sensor after Filter3, then the water that passes through this last filter should have Flow, Purity1, Purity2, and Purity3 set to TRUE, however, the Defender can set these expected values to their liking and can go against the expected norm.
- If the owl can infer what is broken, It can fix the problem (Owl can only fix a problem if the attack is within a set of 3 {i.e. Owl looks at: Sensor1 Filter1 Sensor2; If the attack is on any of those 3, then the attack will be fixed}).

## Attacker

- The attacker can attack all modules except for the Reservoir.
  - NOTE: Application currently doesn't have logic to work with attacks on the Tank
- When the attacker attacks an object it currently has two possible options:
  - One can change the readings read by the owl (i.e. sending fake data to owl)
  - Break the object rendering it from acting as it should (i.e. filter doesn't purify)
    - If a sensor is attacked, the attacker can manipulate the data sent to the owl, IF the owl is directly looking at that sensor.
    - If a pump is attacked it no longer propels water.
    - If a filter is attacked the attacker can choose if it no longer purifies or clogs the filter (doesn't let water pass.)
    - We currently don't have logic attacked for when the tank is attacked.