**PART 1: On the Solving Problem Process**

**Test and Refine the Solution (Debug and Verify)**

1. **Pet eats as expected**

**Input:** Feeding time = 08:00, portion size = 50g, bowl initially empty.

**Process:** Motor runs for 3 seconds, food dispensed, bowl sensor confirms

food present. After 10 minutes, bowl sensor shows empty (pet ate food).

**Expected Output:** “Feeding Successful, Food Eaten.”

**Actual Output:** Matches expectation.

**System works correctly.**

**Explanation:** Under the above condition, the system is operated successfully. At the scheduled time of 08:00, the feeder dispensed a 50g portion into the empty bowl. After the 10-minute of monitoring period, the system confirmed the pet had eaten the food. The final output, “Feeding Successful, Food Eaten,” matched the expected result.

1. **Pet does not eat**

**Input:** Feeding time = 08:00, portion size = 50g, bowl initially empty.

**Process:** Motor runs for 3 seconds, food dispensed, bowl sensor

confirms food present. After 10 minutes, food still in bowl.

**Expected Output:** “Food Not Eaten – Alert Staff” + buzzer activated.

**Actual Output:** Matches expectation.

**Staff is alerted that pet ignored food.**

**Explanation:** When tested for the above scenario where the pet ignored its food, the system performed as expected. After dispensing the 08:00 meal, it waited 10 minutes and correctly detected that the food was uneaten. Along with that, it triggered the "Food Not Eaten" alert and activated the buzzer, successfully matching the expected outcome.

1. **Food bin is empty**

**Input:** Feeding time = 08:00, bowl below 20%, bowl empty.

**Process:** Before motor runs, bowl sensor detects low level.

**Expected Output:** “Low food level – Alert Staff, Feed Skipped.”

**Actual Output:** Matches expectation.

**Prevents false dispensing attempt.**

**Explanation:** The system correctly handled the above scenario where food bin is empty. It dispensed the 08:00 meal, and after 10 minutes, confirmed it was uneaten, triggering the appropriate alert and buzzer as expected.

1. **Compare output with expectations**

* In all the above tested scenarios, the system behaved exactly as expected.
* Alerts (buzzer + log entry) were triggered correctly in failure cases.
* Successful feeding events were logged with correct timestamps

1. **Suggest improvements**

* We can add network alert system where SMS or app notification is sent to the staff.
* We can also adjust the size of portion according to the age and size of pet.
* Battery backup can be added in case of power-cut or power failure.
* And if we have high budget for a single system then we can add a camera and a system through which the system recognizes the pet and its eating.