Test and Improve the Solution (Step 5)

Test Case 1: Scheduled Feeding, Pet Eats Successfully

- **Input:** Current time = 8:00 AM, food available, manual feed not pressed.
- **Expected Output:** Servo runs for 3 seconds, bowl weight drops by ≥5 g, no alert generated.
- **Actual Output:** Servo activated, bowl weight decreased by 6 g, no alert.
- **Result:** Pass – feeding cycle works as intended.

Test Case 2: Scheduled Feeding, Pet Does Not Eat

- **Input:** Current time = 6:00 PM, food available, manual feed not pressed.
- **Expected Output:** Servo runs, bowl weight decreases <5 g, “Uneaten Food” alert issued.
- **Actual Output:** Servo ran, bowl weight dropped by 2 g, alert sent.
- **Result:** Pass – alert function works.

Test Case 3: Missed Detection of Small Portions

- **Input:** Feeding at 8:00 AM, food available, pet eats only 2 g (below 5 g threshold).
- **Expected Output:** Servo runs, bowl weight decreases <5 g, “Uneaten Food” alert issued.
- **Actual Output:** Servo ran, bowl weight decreased by 2 g, but no alert triggered (system ignores very small reductions).
- **Result:** Fail – partial consumption not detected.

Test Case 4: Manual Feeding Request

- **Input:** Manual feed button pressed, food available.

- **Expected Output:** Servo runs, bowl weight decreases ≥5 g, no alert.
- **Actual Output:** Servo ran, bowl weight decreased by 5 g, no alert.
- **Result:** Pass – manual feeding works correctly.

Test Case 5: Empty Food Bin

- **Input:** Current time = 8:00 AM, food bin empty.
- **Expected Output:** No servo action, “Refill Food” alert issued.
- **Actual Output:** No servo action, alert issued.
- **Result:** Pass – food availability check works.

Test Case 6: Servo Malfunction, No Food Dispensed

- **Input:** Scheduled feeding at 6:00 PM, food available, manual feed not pressed.
- **Expected Output:** Servo runs, food dispensed, bowl weight decreases ≥5 g, no alert.
- **Actual Output:** Servo failed to rotate, bowl weight unchanged, no food dispensed, no malfunction alert.
- **Result:** Fail – system does not identify mechanical failure.

Discussion of Logic Issue

The system relies on a fixed 5 g threshold to confirm feeding. This value is too rigid, especially for smaller pets or partial meals. As a result, the system may overlook partial consumption or generate misleading alerts.

Proposed Refinements

- **Adaptive Thresholds:** Adjust the minimum weight change according to the pet’s size or the portion dispensed.
- **Multiple Weight Checks:** Take readings at several intervals (e.g., every 5 minutes for 30 minutes) to detect gradual eating.
- **Supplementary Sensors:** Add a motion sensor or camera to confirm feeding

visually, improving reliability.