Step 5: Test and Refine the Solution

Test Scenarios

Scenario	Input Conditions	Expected Output	Results
Pet eats as expected	Feeding time = 08:00, Food bin = Full, Bowl weight = 0g, then 200g, then 50g, Pet eats 150g of 200g	Dispense 200g → Bowl weight increases by 200g → After 10 mins, bowl weight decreases → Log "SUCCESSFUL FEED"	Works as intended.
Pet does not eat	Feeding time = 18:00, Food bin = Full, Bowl weight = 0g, then 200g, then 200g (no change)	Dispense 200g → Bowl weight increases → After 10 mins, bowl weight is unchanged → Alert staff "Food not eaten" + log data	Correctly alerts staff.
Food bin empty	Feeding time = 08:00, Food bin = Empty	No dispensing → Alert staff "Food bin empty" → log skipped feeding	Prevents malfunction.
Dispense jam/failure	Feeding time = 18:00, Food bin = Full, Bowl weight after motor rotation = 0g	Dispense attempted → No bowl weight increase detected → Alert staff "Dispense jam/error" → Log failed feed	Correctly alerts staff.
Extra eating detected	Feeding time = 08:00, Food bin = Full, Bowl weight = 0g, then 200g, then decreases by 210g	Dispense 200g → Bowl weight increases → After 10 mins, bowl weight has decreased by 210g → System logs abnormal data	Needs improvement.

Discussion of Logic

- The system works well under normal feeding conditions
- The system can detect common problems; no food eaten, empty bin, mechanical issues
- Logs and alerts ensure staff are informed and can take action

Refinements/Improvement

1. **Sensor Calibration –** Ensure weight sensor error don't trigger false alarms
2. **Retry Mechanism –** If dispensing fails once, attempt motor rotation again before sending alert
3. **Portion Flexibility –** Allow custom feeding amounts per pet/animal type
4. **Connectivity Upgrades –** Send alerts via SMS/email instead of just LED/buzzer
5. **Fail-Safe Mode –** If system errors persist, switch to "manual feeding required" status