**Problem Statement**  
A pet feeder that can:

1. Dispense food for cats and dogs at scheduled times.
2. Monitor whether food has been consumed or measure the amount consumed.
3. Alert staff if no food is dispensed or if the food is not eaten within a set period.
4. Operate on inexpensive components (e.g., servo motor, basic sensors).

**Assumptions**

* One type of dry food for all pets.
* Two fixed feedings per day (initial version).
* Limited processing power (Arduino-class microcontroller).
* Alerts via buzzer/LED only in first version (no internet).

**Input**

* Current time (RTC module).
* Feeding schedule.
* Food bin level (%).
* Bowl weight before and after feeding.
* Manual override button.

**Output**

* Servo motor activation (dispense food).
* Alerts (buzzer, LED).
* Feeding log entry.

**Data Table**

|  |  |  |  |
| --- | --- | --- | --- |
| Input | Type | Sample Values | Constraints |
| Current time | Digital RTC | "08:00", "18:00" | 24-hour format |
| Feeding schedule | Stored array | 2 per day | Max 4/day in design |
| Food bin level | % (float) | 100%, 50%, 10% | Alert if < 15% |
| Bowl weight before feed | g (float) | 0g, 30g | 0–500g |
| Bowl weight after feed | g (float) | 100g, 120g | Compare to detect eaten food |
| Manual override | Boolean | TRUE/FALSE | Immediate dispense |

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| --- | --- | --- | --- |
| Output | Type | Sample Values | Constraints |
| Rotate servo motor | Angle (deg) | 90°, 180° | Dispense cycle |
| Send alert | Boolean + msg | “Low food”, “Not eaten” | Within 10 mins |
| Feeding log entry | Text file | “08:00 fed, eaten” | Store in EEPROM/SD card |

**Decision Logic**

1. Check current time.
2. If time matches feeding schedule:
   * Check food bin level. If < 15%, alert and skip.
   * Dispense food via servo.
   * Record bowl weight after dispensing.
   * Wait 10 minutes, check again.
   * If no weight drop, alert “Not Eaten”.
   * Else, log “Feed Success”.
3. Allow manual override to trigger feed anytime.

|  |  |  |  |
| --- | --- | --- | --- |
| Scenario | Input Conditions | Expected Output | Pass/Fail |
| Pet eats as expected | Food level 80%, bowl weight drop > 10g after 10 min | Log "Feed success" | Pass |
| Pet does not eat | Food level 80%, bowl weight drop < 10g after 10 min | Alert "Food not eaten" | Pass |
| Food bin empty | Food level 5% | Alert "Low food", no dispense | Pass |
| Manual override used | Button pressed | Immediate dispense + log "Manual feed" | Pass |

**Refinements**

* Add internet/SMS alerts.
* Add camera verification.
* Adjustable portion sizes.
* Track long-term eating trends.