**Step 1: Understand and Define the Problem (Analyse)**

**Problem Statement**

A local animal shelter requires a low-cost automated pet feeder that can dispense food to cats and dogs at pre-scheduled times, track whether the food has been eaten (or how much was eaten), and alert staff if any issues occur. The solution must be designed first as a logic simulation using common sense and problem-solving methods before considering hardware like servo motors or sensors.

**Key Features the Feeder Must Include**

1. Scheduled Food Dispensing - The feeder must dispense food at specific times (e.g., morning and evening).
2. Monitoring of Food Consumption - The system should check if the pet has eaten, using a sensor such as a weight sensor under the bowl.
3. Alerts for Problem - If food is not dispensed, not eaten, or the container is empty, the system must alert staff.
4. Low-cost Implementation - The design must assume affordable components, such as a servo motor for dispensing and simple sensors (weight, food level).
5. Continuous Operation - The feeder should operate reliably throughout the day without manual intervention.
6. Basic User Settings - Staff should be able to set feeding times or modify them if required.

**Inputs and Outputs**

**Inputs (from environment or sensors):**

* Real-Time Clock (RTC): Provides the current time for the feeding schedule.
* Feeding Schedule (present): List of feeding times set by staff.
* Food Level Sensor: Detects whether the food container has enough food.
* Weight Sensor (under bowl): Detects food placed in the bowl and whether the pet has eaten.

**Outputs (system responses):**

* Servo Motor Control: Rotates to dispense food into the bowl.
* Alerts/Notifications: Trigger buzzer, light, or send a digital alert if something goes wrong (food not eaten, container empty).

**Assumptions and Limitations**

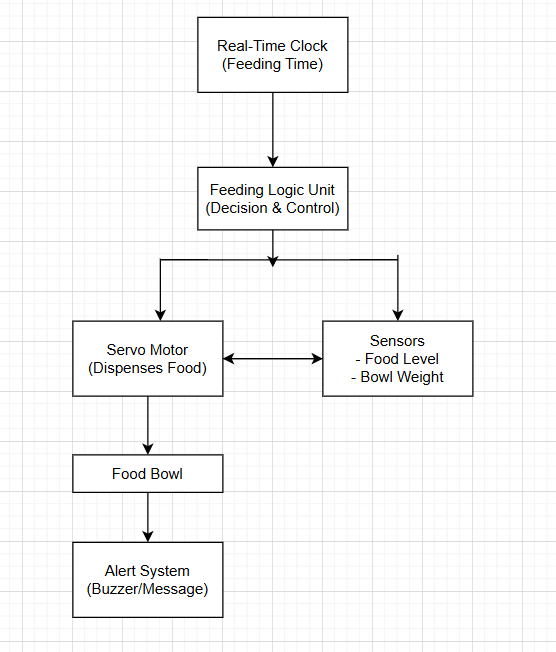
**Assumptions:**

1. The feeder serves one bowl per feeding time (cats/dogs fed separately).
2. Only dry pet food is used (since it works with a dispenser).
3. Feeding times are pre-set (e.g., 8:00 AM and 6:00 PM).
4. The system has a stable power supply.
5. Sensors and motor are functioning and calibrated properly.

**Limitations:**

1. The system cannot differentiate between multiple pets (assumes one pet eats from one bowl).
2. It does not handle wet food (only dry kibble).
3. Memory and processing power are limited (only basic schedule and sensor monitoring).
4. Staff must refill the food container manually when alerted.
5. Alerts may only be basic (sound/light) unless expanded to mobile notifications.

**Simple Block Diagram of the System**

****