Analysis & System Diagram(Step 1)

Problem Statement

Animal shelters often struggle to maintain consistent and timely feeding routines for cats and dogs. To address this challenge, a low-cost automated pet feeder system is required. The system must be able to dispense food at pre-set times, ensuring regular and reliable feeding without relying solely on staff availability.

The feeder should include weight sensors to track how much food is eaten, enabling shelters to monitor each animal's consumption patterns more effectively. In addition, the system should feature an alert function that immediately notifies staff if issues occur—for example, when the food bin is running low or when the animals fail to eat. These alerts will help staff respond quickly and prevent interruptions in feeding.

Ultimately, an automated feeder will make shelter operations more efficient by reducing manual labor while safeguarding animal health. By guaranteeing scheduled meals and providing real-time monitoring, this solution will promote both the well-being of the animals and the smooth running of daily shelter activities.

Assumptions & Limitations

- The feeder is designed to work with a single type of dry pet food.
- Feeding times are set in advance but can be customized by the user.
- The system monitors the bowl and triggers an "uneaten" alert if less than 5 g of food is consumed within 10 minutes.
- Feeding schedules are limited to 7 slots, and the device does not retain any past feeding history.
- It operates on 12 V DC power, has no battery backup, and cannot notify users during a power outage.
- The food container must be refilled manually when empty.

Inputs & Outputs:

- **Inputs:** User-set feeding times, food-level sensor (full/empty), bowl weight in grams.
- **Outputs:** Servo motor to dispense food, buzzer or LED for alerts, and an LCD display for status information.

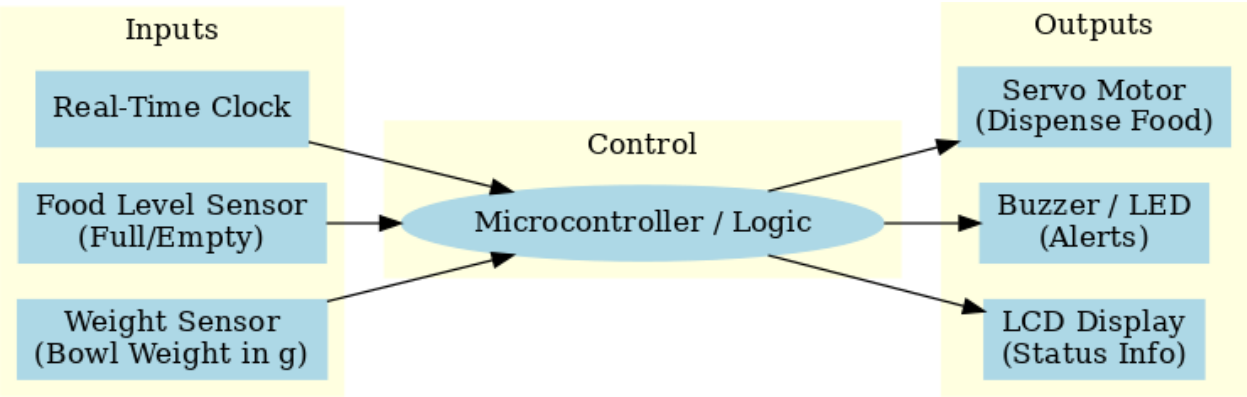

Figure: System Overview