Part 1 – Problem-Solving Process

Step 1 – Problem Analysis

Problem Statement:
The local animal shelter requires a low-cost, programmable automated pet feeder capable of reliably dispensing food to cats and dogs at scheduled intervals. The system must monitor food consumption, detect feeding issues, and alert staff when intervention is required. This solution should be designed using simple, affordable components (e.g: servo motors, weight/infrared sensors) and be adaptable for potential real world implementation.

Key Features:

1. Scheduled feeding at pre-set times.
2. Monitoring of whether food has been consumed (via weight or IR sensor).
3. Alert system for issues (food not dispensed, uneaten food).
4. Capacity for both cats and dogs.
5. Low-cost, scalable design.

Assumptions:

- The shelter uses only dry pet food (easier to dispense mechanically).
- The system will operate indoors.
- One type of bowl per unit; pets do not share bowls.
- Power is stable, and a small backup battery is available.
- Staff can program feeding schedules.

Inputs & Outputs:

- **Inputs:** Feeding times, food bin sensor readings, bowl weight sensor readings, staff manual override.
- **Outputs:** Motor rotation to dispense food, alert notification, log entry of feeding event.

System Sketch / Block Diagram:

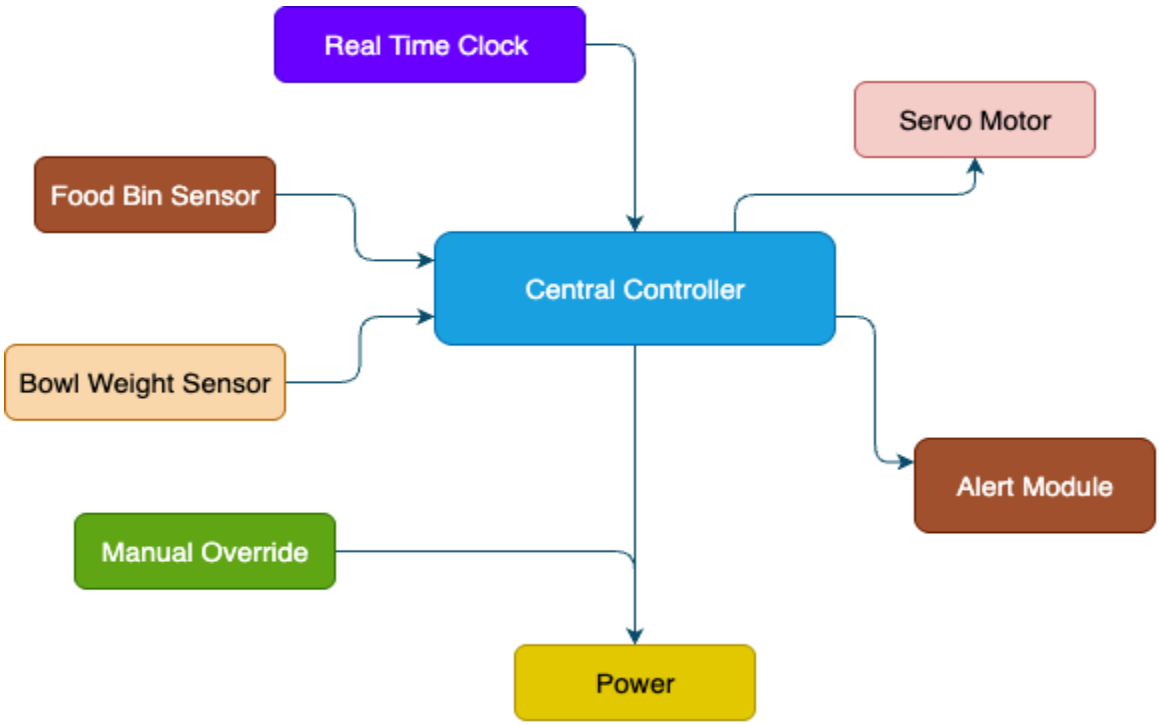

Figure 1: Automated Pet Feeder System Block Diagram