PART 3: AI Agent Integration

Prompts and Responses

Prompt 1:

"Review my Step 4 implementation and suggest improvements or identify potential issues."

Copilot Response (Summary):

Copilot identified several issues in my original logic, such as using a broad time window instead of scheduled feeding times, lack of jam detection, and missing pre-checks for hopper level and sensors. It suggested a modular approach with functions like isFeedDue(), preChecksOK(), and monitorConsumption(). It also recommended adding alert escalation, LED status states (GREEN, AMBER, RED), and safeguards for overfill and servo jams.

Prompt 2:

"How could this system be implemented using Arduino or Raspberry Pi with low-cost components?"

Copilot Response (Summary):

Copilot explained that the system could use:

- **Servo motor** for dispensing food.
- **Load cell with HX711 module** for weight measurement.
- **IR sensor** to detect bowl presence.
- **RTC (Real-Time Clock)** for accurate scheduling.
- **Buzzer and LED indicators** for alerts.
- **Arduino Uno or Raspberry Pi** as the controller, with optional Wi-Fi for remote alerts.

It also suggested using a simple loop for scheduled checks and modular code for reliability.

Insights and Improvements

Copilot's feedback helped me:

- Replace a simple time window with a **true schedule-based feeding system**.
- Add **error handling** for jams, empty hoppers, and sensor faults.
- Design a **realistic hardware plan** using affordable components.
- Improve documentation clarity by structuring logic into modular steps.

Influence on Final Solution

AI assistance significantly improved the robustness and practicality of my design. It transformed my initial nested logic into a modular, maintainable structure. This guidance also showed me to anticipate real-world variables like sensor failure and food jams, which I had not considered before.