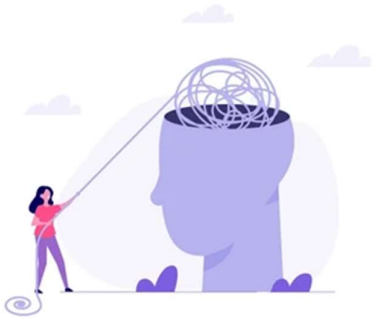
1. Understand and Define the Problem (Analyze)

1.1. Understand the Problem.

A local animal shelter needs a low-cost, programmable automated pet feeder for cats and dogs. The feeder must dispense food at scheduled times, check if food was dispensed and eaten (or how much was eaten), and alert staff if something goes wrong (eg: no food dispensed, food not eaten). The first output is the logic and behavior design that could later run on cheap hardware like a microcontroller with a servo motor and a few sensors.



1.2. The features must the feeder include.

- Alert system

  Notifies staff if there's a problem (eg: no food dispensed, pet hasn't eaten, food bin is empty).

- Simple event logging

  Record feeding times, portion sizes, and alerts.

- Scheduled feeding times

  Store up to 3 daily feeding times per feeder.

- Usage monitoring

  Detect whether food was dispensed into the bowl and whether it was eaten

- Manual options to feed

  Allow staff to feed pets manually in case of a system error.

1.3. Inputs

- Feeding times (set by staff)
- Portion size
- Pet ID/type
- Real-time clock time/date
- Food storage level sensor
- Bowl weight sensor (grams before/after feed)
- Manual feed button

1.4. Outputs

- Event log of feedings, consumption, and alerts
- Notify alerts, LED
- Servo motor control (to dispense food)

1.5. Assumptions or Limitations

- Low-cost components
- Limited data storage
- One feeder serves one pet at a time (avoids multi-pet conflicts)
- Limited memory
- Max 3 feedings per day

1.6. Block Diagram (Sketch)