**Basic Traffic Light System**:

Task: Model a basic traffic light system that transitions between green, yellow, and red states.

Extension: Add pedestrian lights and a button that triggers a pedestrian crossing phase.

**Elevator Control System**:

Task: Design a state machine for an elevator system in a 3-floor building. Consider states like "Moving Up", "Moving Down", "Idle", etc.

Extension: Handle emergency situations, like when an emergency button is pressed.

**Temperature Control System**:

Task: Model a thermostat control system. The system should have states like "Heating", "Cooling", "Idle", based on the current and desired temperatures.

Extension: Incorporate a fan system that turns on when the temperature is too high, even if the cooling isn't active.

**Digital Watch System**:

Task: Design a state machine for a digital watch with modes like "Display Time", "Set Hours", "Set Minutes", and "Alarm".

Extension: Add stopwatch and timer functionalities.

**Password System**:

Task: Model a system where a user enters a numeric password. The system should have states like "Awaiting Input", "Checking Password", "Access Granted", and "Access Denied".

Extension: Add a "Lockout" state if the incorrect password is entered three times in a row.

**Vending Machine**:

Task: Design a state machine for a vending machine. Consider states for waiting for money, selecting products, dispensing, and giving change.

Extension: Incorporate a "Maintenance Mode" state.

**Music Player Interface**:

Task: Model a basic music player with states like "Playing", "Paused", "Stopped", "Forward", and "Rewind".

Extension: Add volume control and track selection states.

**Automatic Door System**:

Task: Design a state machine for an automatic sliding door. The door should open when someone approaches and close after they leave.

Extension: Add safety features, like a state for detecting if something is blocking the door.

**Battery Charging System**:

Task: Model a battery charging system. Consider states like "Charging", "Full", "Discharging", and "Low Battery".

Extension: Integrate temperature monitoring and go into a "Cool Down" state if the battery gets too hot.

**Game Design**:

Task: Design a simple game, like tic-tac-toe or a maze solver, using state logic to determine game states and player moves.

Extension: Incorporate more complex game mechanics or multi-player modes.