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**📘 Documentation: Model-Based Reflex Agent (Temperature Control)**

**Overview**

This project implements a **Model-Based Reflex Agent** that controls room temperature by deciding whether to turn the heater **on** or **off**. The agent not only makes decisions using conditional logic but also **remembers past decisions** by storing them in a memory file. This improves efficiency by reusing past knowledge instead of recalculating every time.

**Components of the Agent**

**1. Desired Temperature**

* The target temperature that the agent tries to maintain in every room.
* Provided as an input when creating the agent.

**2. Memory File (memory.txt)**

* A file used as a **knowledge base** where past experiences are stored.
* Each entry contains:
  + The room’s **current temperature**.
  + The **action taken** by the agent.
* Helps the agent avoid repeating calculations for the same conditions.

**3. Check Memory**

* Reads from the memory file.
* If a given room temperature has been encountered before, the corresponding action is reused.
* This step makes the agent more efficient.

**4. Update Memory**

* When a new temperature is encountered, the agent decides the action and then **saves it to memory**.
* Ensures future decisions can be made directly from stored knowledge.

**5. Decision-Making Process**

1. **Check memory:** Look for a matching temperature in past records.
   * If found → reuse the stored action.
2. **Calculate action (if new):**
   * If current temperature is **lower** than the desired temperature → "Turn on heater".
   * If current temperature is **higher or equal** → "Turn off heater".
3. **Store action:** Save the new temperature-action pair in memory for future use.

**Simulation**

The agent is tested in multiple rooms (Living Room, Bedroom, Kitchen, Bathroom, Garage) with different temperatures.

* When encountering a **new temperature**, the agent calculates and stores the action.
* When encountering a **duplicate temperature** (e.g., Garage with 18°C, same as Living Room), the agent retrieves the decision from memory instead of recalculating.

**Key Features**

* **Model-Based:** Maintains internal state (via memory file).
* **Efficient:** Avoids redundant calculations by reusing past knowledge.
* **Adaptive:** Learns and remembers new situations automatically.
* **Reusable:** Can work with any environment where conditions repeat.