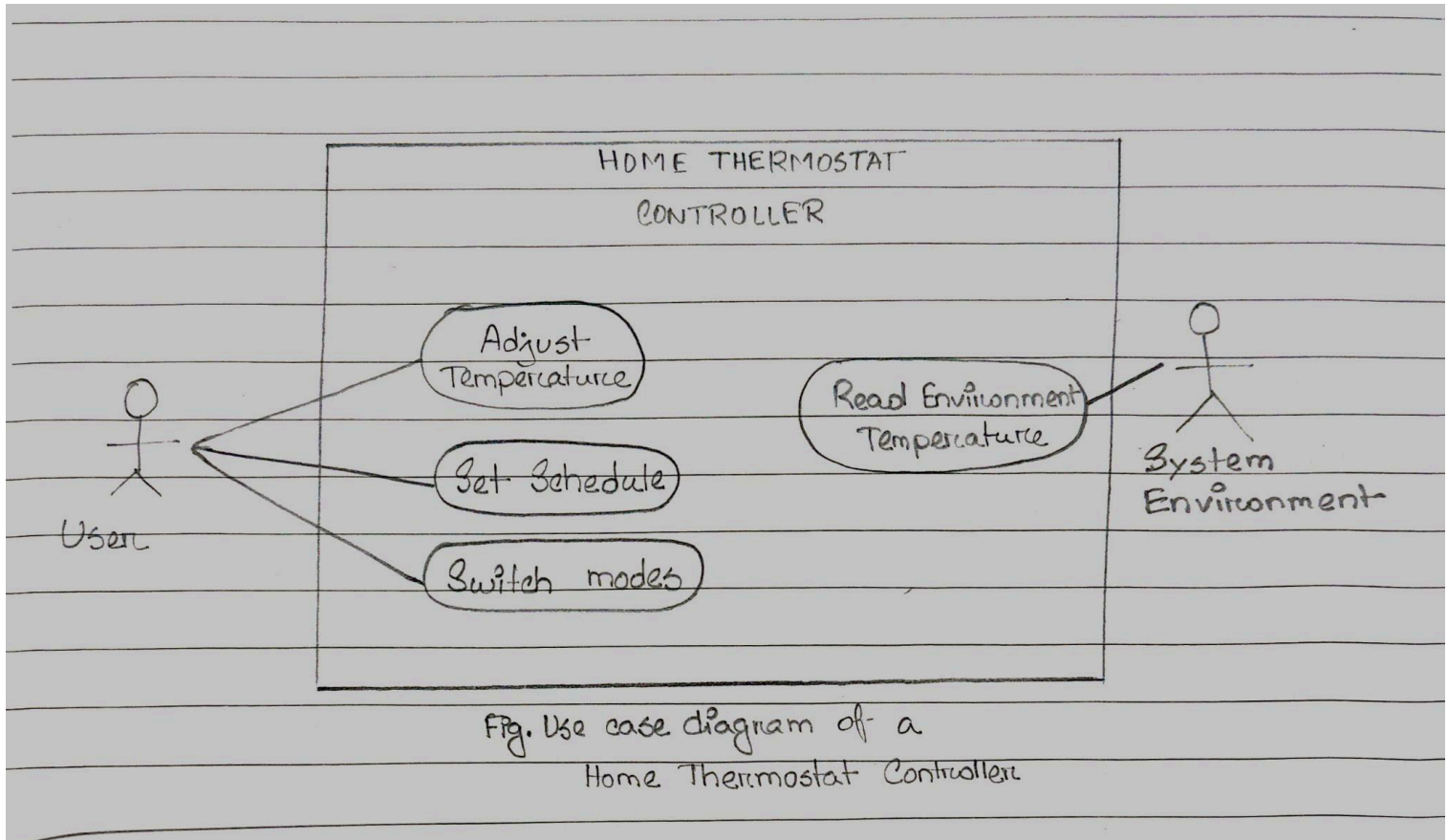


Use Case Diagram for Home Thermostat Controller



Use Case 1: Adjust Temperature

Actors: User

Description:

- The user interacts with the thermostat interface.
- The user selects the option to adjust temperature.
- The user sets a new desired temperature.
- The system confirms the change and adjusts the control in the HVAC system.

Use Case 2: Set Schedule

Actors: User

Description:

- The user opens the scheduling feature on the thermostat interface.
- The user programs a temperature schedule, specifying different temperatures for different times.
- The system saves the schedule and confirms it to the user.
- The system automatically adjusts temperatures according to the schedule.

Pre-Conditions:

The current time and date are correctly set on the thermostat.

Use Case 3: Switch Modes

Actors: User

Description:

- The user selects the mode switch option on the thermostat.
- The user switches between different modes (e.g., heating, cooling, fan-only, auto, or off).
- The system activates the chosen mode and confirms to the user.
- The system sends a signal to the HVAC system to change its operation mode.

Pre-Conditions:

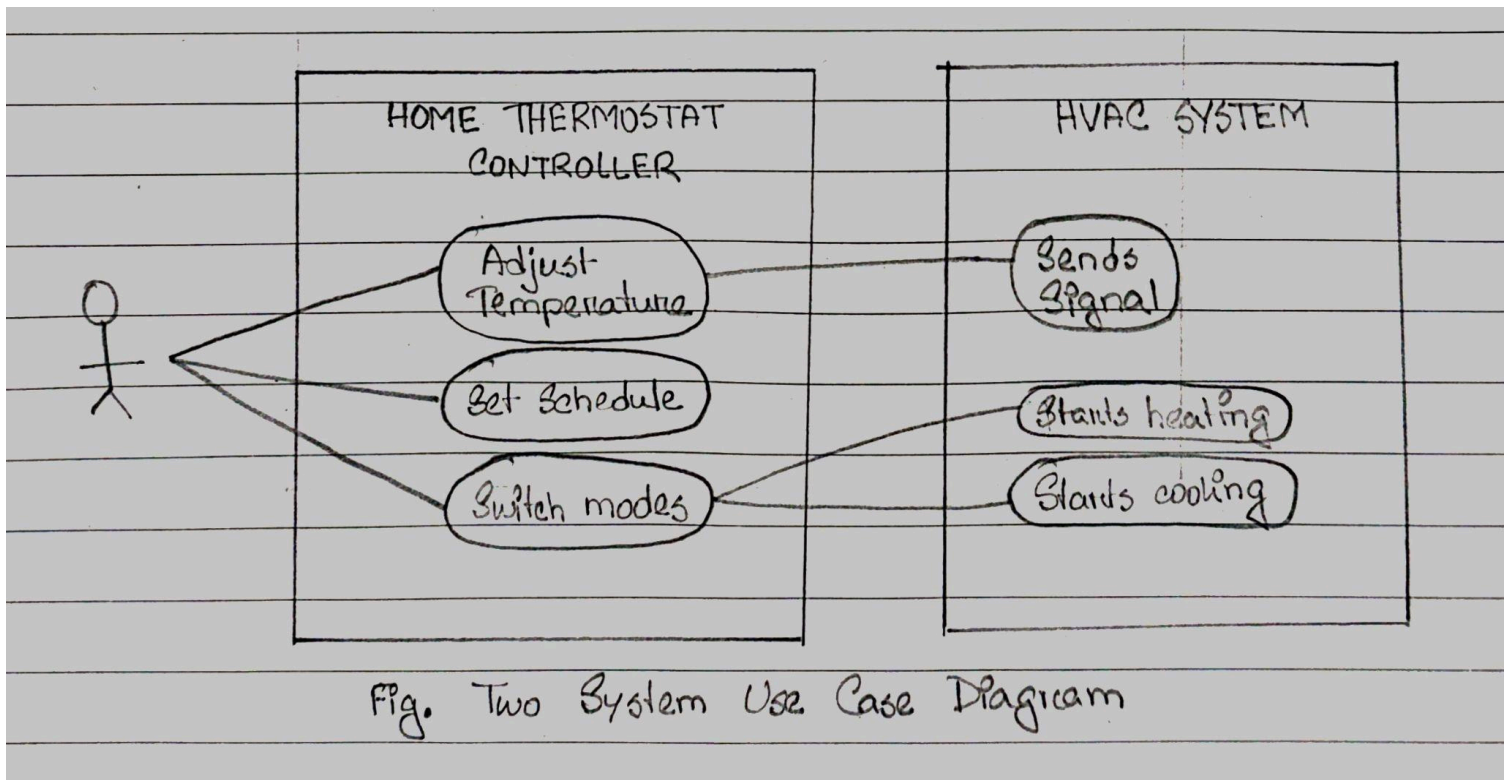
The thermostat is not currently in a locked or restricted mode.

Use Case 4: Read Environment Temperature

Actor: System Environment

Description:

- The system needs accurate temperature readings to make the correct heating/cooling decisions.
- The sensor reads the current temperature, and the system updates the display.



Use Case 1: Sends Signal

Actors: Home Thermostat Controller

Description:

- The thermostat controller detects a need for temperature change.
- The thermostat sends a signal to the HVAC system to start heating or cooling.
- The HVAC system receives the signal and proceeds to the next steps.

Use Case 2: Starts Heating

Actors: HVAC System

Description:

- The HVAC system receives a signal from the thermostat to start heating.
- The heating unit turns on and begins to warm the air.

- The system circulates the warm air throughout the environment.
- The system monitors the environment's temperature until the thermostat's set point is reached.

Use Case 3: Starts Cooling

Actors: HVAC System

Description:

- The HVAC system receives a signal from the thermostat to start cooling.
- The cooling unit turns on and begins to cool the air.
- The system circulates the cool air throughout the environment.
- The system monitors the environment's temperature until the thermostat's set point is reached.

Multi-System Use Case Diagram Integration

For integrating an actor for the connected HVAC system, I would choose the "**Systems as Actors**" method. This method allows for a clear delineation of the responsibilities between the thermostat and the HVAC system, which can be considered two separate systems with their own capabilities.

The "Systems as Actors" method is suitable because it:

- clearly defines the interaction between the thermostat (as a control unit) and the HVAC system (as the executor).
- Allows for the possibility of adding more systems in the future, such as smart vents or air quality monitors.
- Provides an intuitive way for stakeholders to understand the interactions and responsibilities of each system involved.

- The temperature reading in the environment can be considered an actor in the sense that it is an external source of information that the system interacts with. It is typically represented as a passive actor since it does not trigger actions but is crucial for the system's decision-making.
- To maintain clarity, each use case is broken down into steps that describe the interactions between the actor and the system sequentially.

This structure gives a more granular and detailed view of the interactions between the user, the thermostat controller, and the HVAC system. It ensures that the user's needs are met through a series of steps that the system logically follows. By using this method, we can illustrate the HVAC system's actions as reactions to the user's inputs through the thermostat while also showing the autonomous actions the HVAC system might perform, like self-diagnostics or energy-saving adjustments when the home is unoccupied.

Reference: [ChatGPT Chatlog](#)