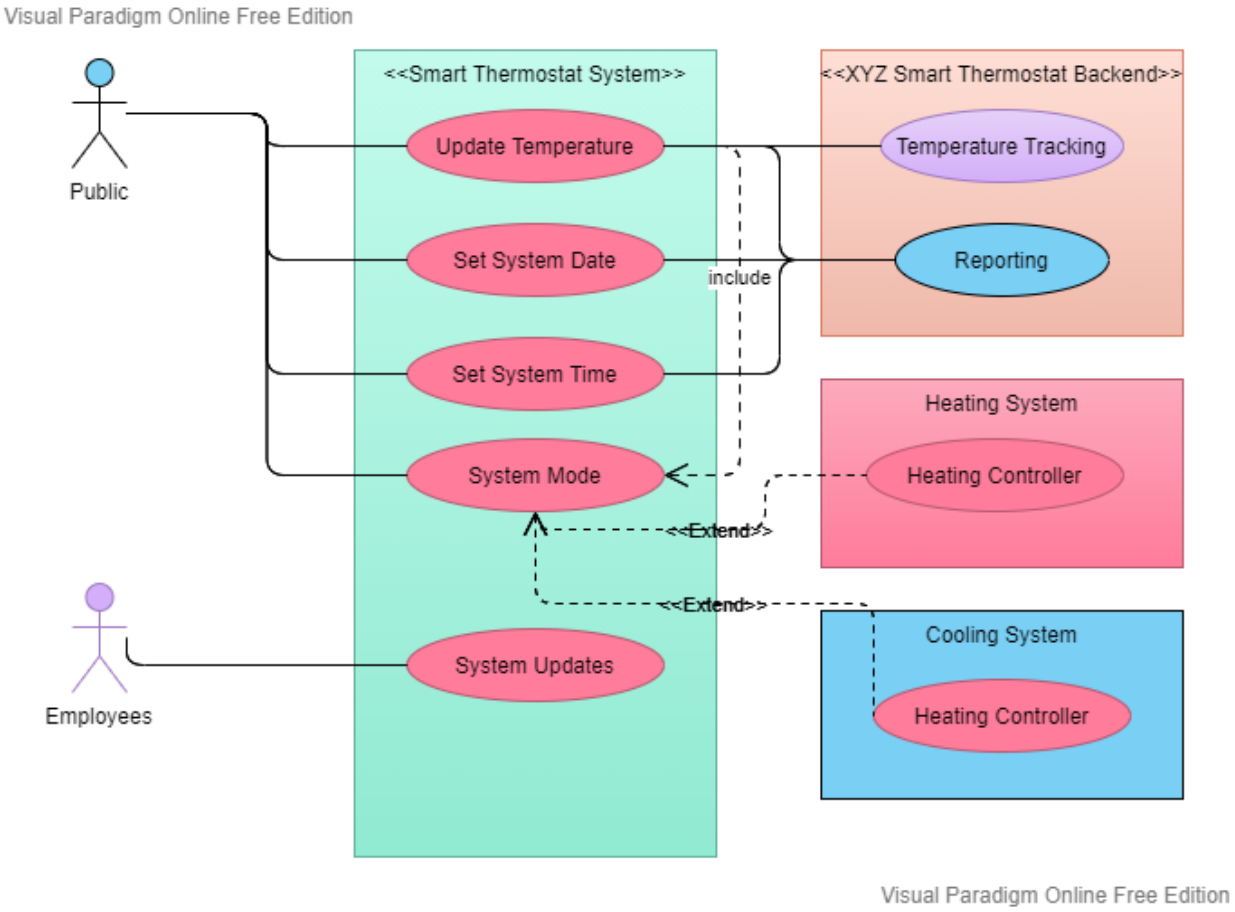
Assignment 2: Designing UML Diagrams

Aaron Kephart

UML Case Diagram



Actors:

In this use case diagram, I determined there would be the general public interacting with the system, and employees to push the system updates or maintain the system.

Systems:

There are a total of 4 separate systems, including the Smart Thermostat System frontend with which the user will interact, the Smart Thermostat Backend which will handle tracking and reporting temperatures for future automated adjustments based on date/time temperature increased or decreased. There are also the heating and cooling systems with which the smart thermostat system will interact.

Use Case Mapping Explanation

The public and the employees are system actors and depicted as stick figures (Practical Application for Software Engineering: UML Case Diagram, 2018). The public actor will be able to update the temperature, in which case the date, time, and temperature will be recorded. The public will also set system date, and time. The public MAY update system mode manually, or it may automatically update

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based on temperature using the include dependency defined above. The relationships and interactions are solid when they are basic, and dashed when indicating “one-way data flow or exclusive communication” (Practical Application for Software Engineering: UML Case Diagram, 2018). Depending on the temperature, the heating cooling system will engage sometimes, respectively. These two systems have extended dependencies and are considered external relationships that cannot be managed by the smart thermostat system on their own on the system mode (Practical Application for Software Engineering: UML Case Diagram, 2018).

Importance

The use case diagram is a vital to understand how users interact with system through a high-level overview. It is used to “depict how people in various roles (actors) will use a technology resource” and demonstrates a scenario (Practical Application for Software Engineering: UML Case Diagram, 2018). It also assists the software/hardware engineering team in defining the project requirements and carrying out those requirements to create a usable system through general definitions of the system to be developed and the associations of that particular system, in addition to integration with related systems.

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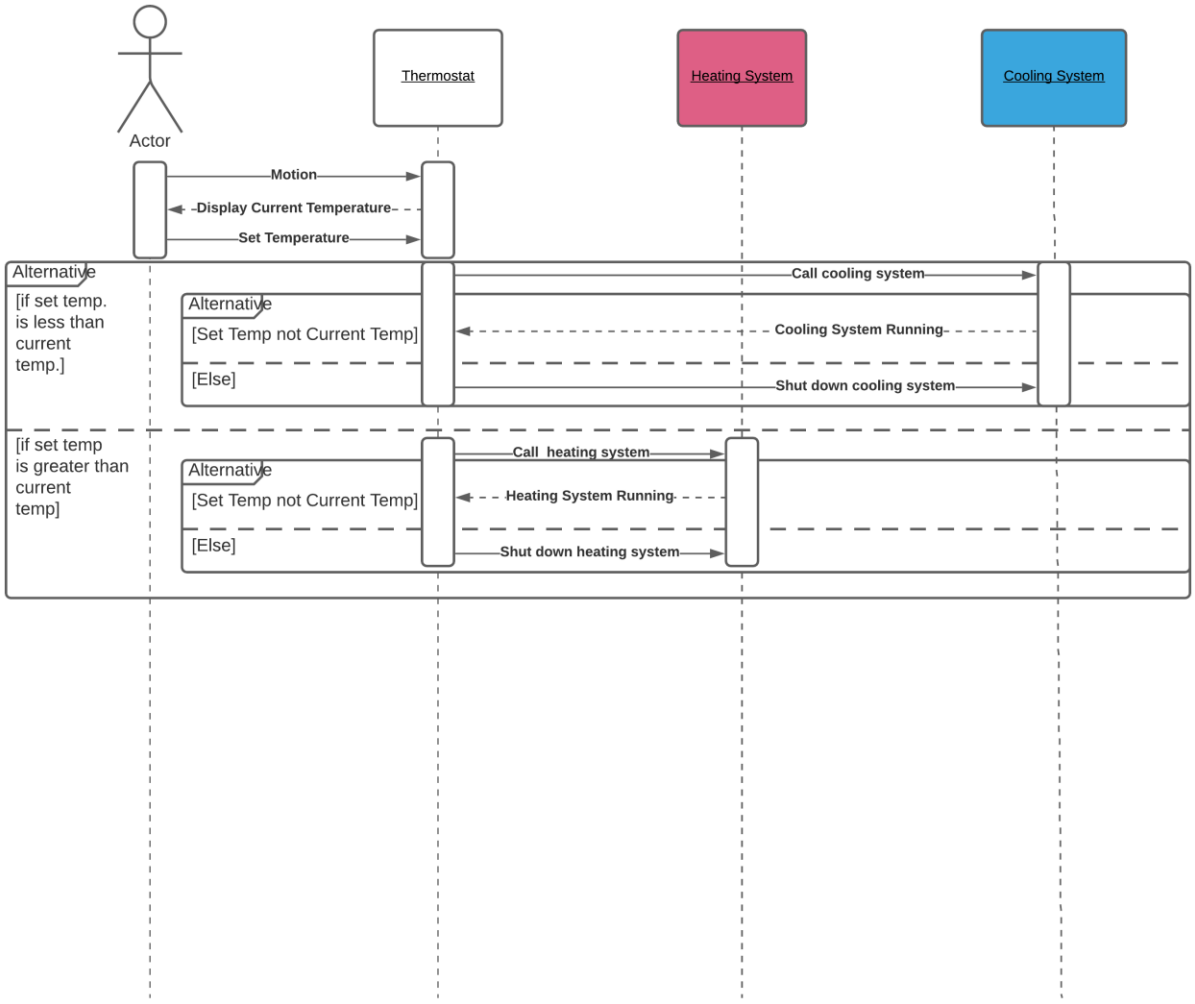
UML Sequence Diagram



Actors

Actors in this case is the user interacting with the thermostat.

Systems

The systems in this case are the thermostat system, and the heating and cooling system with an actor or external user interacting with the thermostat.

Interaction Analysis

The actor moves in front of the thermostat, which causes the thermostat to return the current temperature setting. The actor then sets the temperature, which determines if the thermostat will enter into heating or cooling mode. If the set temperature is less than the current temperature of the room, it sends a call to the cooling system. The cooling system returns the status that it is running, until the set temp is the actual temperature. When this criterion is met, the cooling system shuts down. The

same is true if the temperature is set greater than the actual temperature, but instead the heating system will run until the set temperature is equal to the actual temperature of the room.

Importance

The importance of the sequence diagram is that it takes a closer look at the process of interacting with the system, and the results of those interactions. This is an interaction diagram, meaning it demonstrates the interactions between the different systems and more specifically, the sequence diagram “represents how different objects work in order” (UML Models: Design & Examples, 2018). It also provides a more detailed view of how the systems interact with one another and all associated processes, and really lays the groundwork for the system to be designed in a very logical manner.

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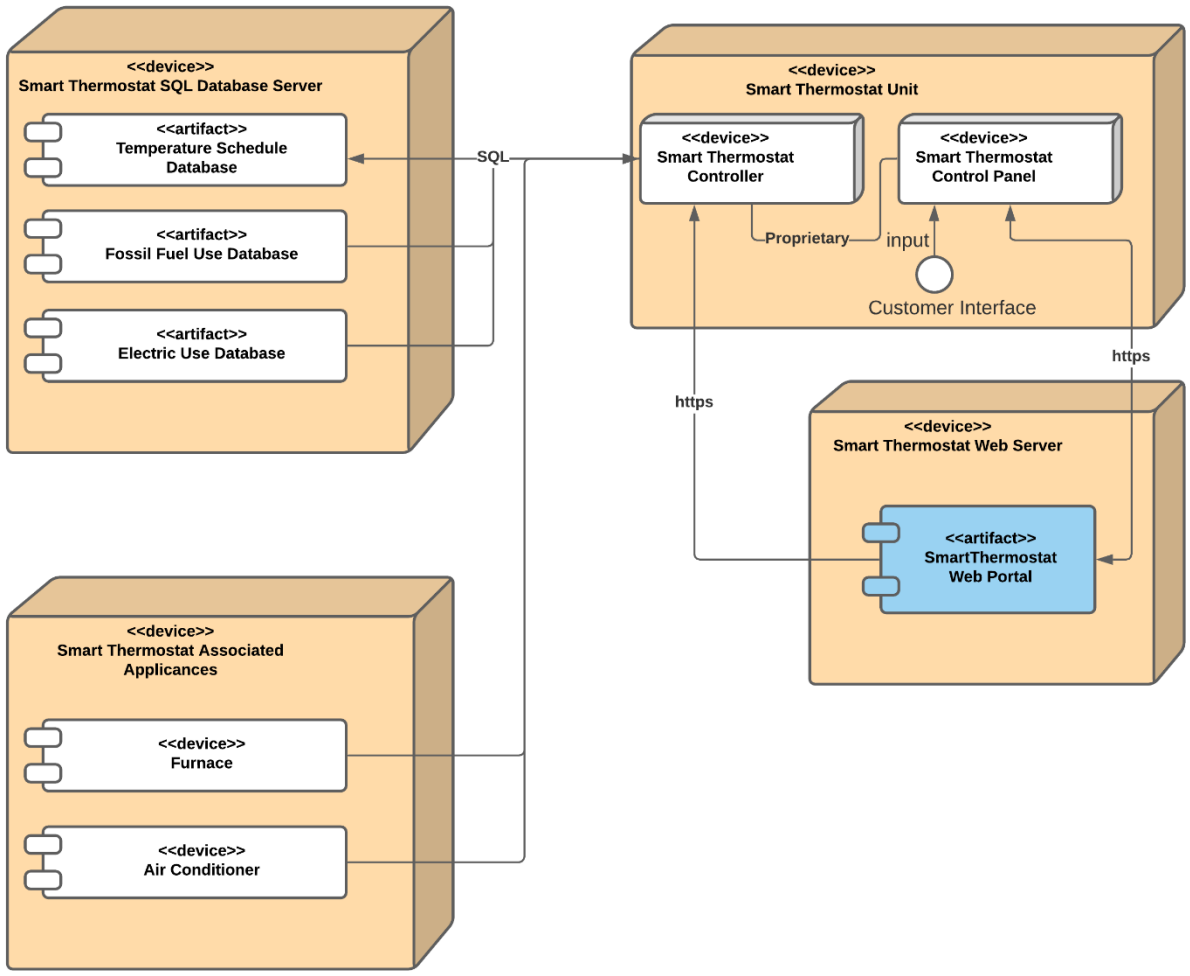
UML Deployment Diagram



Devices

In this deployment diagram, I am listing the devices for deployment. The smart thermostat web portal is a way for users to update temperature via a web browser, which integrates with the smart thermostat control panel via the HTTPS protocol.

Via the SmartThermostat controller, the web portal can also be used to retrieve information from and update the temperature schedule database, fossil fuel use database, and the electric use database. The smart thermostat unit consists of the control panel, and the actual controller. Customers can also interact with the control panel. When the control panel is updated, this sends a command to the controller, which then updates the smart thermostat associated databases.

There are three databases listed, the temperature schedule database which records temperature settings by day of the week, and time for future settings, and both the fossil fuel and electrical usage databases. Furthermore, the controller controls the associated appliance devices, including the furnace and air conditioner.

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Importance

The importance of the UML Deployment Diagram is to further define deployment constraints and the communication protocols utilized between each system and artifact. It represents “how a software is deployed over hardware components” (UML Models: Design & Examples, 2018). It further defines the integration of the system with the associated systems and drills down details to create a product that is suitable to the end user. It illustrates from a birds-eye view what the system is supposed to do and develops a thought process closer to what a system designer could use to actually deploy the system.

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References

"Practical Application for Software Engineering: UML Case Diagram." *Study.com*, 19 June 2018, study.com/academy/lesson/practical-application-for-software-engineering-uml-case-diagram.html

UML Models: Design & Examples. (2018, August 22). Retrieved from https://study.com/academy/lesson/uml-models-design-examples.html.