Brivo Take Home Coding Assignment

Goal

The goal of this assignment is to assess your high level architecture skills. We will be looking at how you design the solution for the given problem, and how that will stand up to additions we will want to make to it. The key here is that unexpected requirements will come to your code just like the real world. We want to know how well you design things for the future without adding unnecessary complexity.

Problem Space

At Brivo we deal with a lot of different devices and manufacturers are always coming out with new ones. We can not control how or when these devices are made, nor which devices our customers will be interested in. We would like you to model some classes and database models that can be used to store data about these devices, and interact with them. All interactions with the devices can be pseudo code or comments like “here I would send this data to the device”, but it should be noted what data you would need to send to the device. You can fill out the solution as much as you like but we suggest you spend no more than 4 hours completing this challenge.

Devices

There will be a few IOT devices that would reside in a customers house. Your system needs to be able to model the following devices, and we will be assessing how easy it is to add more devices to the list of supported devices. Special attention will be given to how modular the design is, and which data is stored in the models or retrieved from the device itself. Anything that is not self explanatory in the code should be documented with comments. Also any code you feel would be required for operation, but feels beyond the device modeling can be pseudo code comments.

Note: all devices below should be able to be turned off and on.

- A Thermostat with the following settings
    - Upper temperature limit
    - Lower temperature limit
    - AC/Heater enabled
    - Toggle fahrenheit/celsius
- And the following behavior
    - Toggle fan

    - Temporarily Turn on Fan for 5 minutes
    - Get current Temperature

- Another thermostat with the same properties as before but additionally this thermostat has a humidity sensor and humidity controller with the following settings
    - Target Humidity
- And the following behavior
    - Get current humidity

- A front door lock with a keypad with the following settings
    - An array of pin codes of either 4,6, or 8 digits and a limit of 25 codes
    - A master code that resides in the first slot of the codes.
    - An auto lock timeout setting where the lock can auto lock after a number of seconds, or be disabled.
- And the following behavior
    - Lock/Unlock the door
    - Add / Remove codes
    - Factory Reset codes
    - Get lock status (secured/unsecured)

- Another front door look with the same behavior as the previous door lock, except the limit of codes is 100

- A window open/close sensor with the following behavior
    - Get Current status (secured/unsecured)

- A Temperature sensor with the following settings
    - Toggle fahrenheit/celsius
- And the following behavior
    - Get Temperature

- A device with a Humidity sensor, a flood sensor, a Temperature Sensor, and a built in alarm with the following settings
    - Toggle fahrenheit/celsius
    - Set volume (number 1 through 10)
    - Toggle Alarm
- And the following behavior

        - Get humidity
        - Get flood status
        - Get temperature
        - Temporarily silence alarm

- A CO/Smoke detector with the following settings
    - Set alarm noise (number 1 through 4 for different sounds)
    - Set volume (number 1 through 10)
- And the following behavior
    - Temporarily silence
    - Get CO levels
    - Get smoke levels

You will also need to handle an “Unknown Device” that can be turned on and off.

Bonus

Write some queries/functions, that can find out the following information. For the sake of the assignment you can assume all devices in the system belong to a single property.

- Is the property secured?
- What is the temperature in the property
- What is the humidity level in the property
- Silence all alarms on the property
- Secure the whole property
- How many more pin codes can the property hold?