

# Designing a System

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- We need to design an IoT system for a building.
- There will be a central control device that can update or shutdown all other devices.
- In each room there is an infrared sensor to detect when the room is in use. If it is, then it should turn on the light for that room. If no activity is detected in a certain amount of time then the light should be turned off.
- The central control device should be able to display status information about each device.

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- To solve this problem you will need to define many things.
- When does the status update?
- Is the timer part of the light, the sensor, or the controller?
- Does the control device need a connection to all process, or can it propagate over a network?

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- Our system is so good that everyone wants in our building, so we're going to have to add a security system.
- Each door has an Card Scanner. When a card is scanned it will consult a database of acceptable cards. If a card is accepted, the scanner will unlock the Lock for the corresponding door only.
- As an additional security measure, only one Lock can be unlocked at a time.
- The central controller still needs its status updates on the Locks, Scanners, and Database.
- The central controller must be able to unlock all doors in an emergency.

# Subprocesses

- When designing concurrent and parallel systems it can be difficult to reason about what is happening.
- You often find that certain processes are linked.
- Grouping processes into one larger process can lead to easier to reason code, and better enable code re-use.
- It also means that huge, complicated diagrams can be simplified massively.