

# IOB22

Digital Product  
Development

Demo

## Module 5 Software



By Jacky Bourgeois

## The Connected Doorbell

# IOB22

## Digital Product Development

## Module 5 Software



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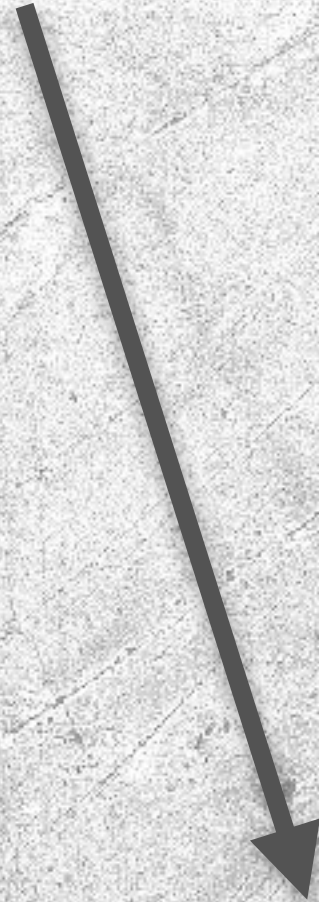
- How to collaborate through modelling?

# Software Design as Industrial Designers

- Map requirements with customers
- Implement functional prototypes
- Bring the product team together

# Development Process

**From Waterfall**



**To Agile and Lean**

# Development Process

**From Waterfall**

Completeness  
Documentation



**To Agile and Lean**

Iteration  
Conversation

# Unified Modelling Language (UML)

Structural View

Behavioural View

User View

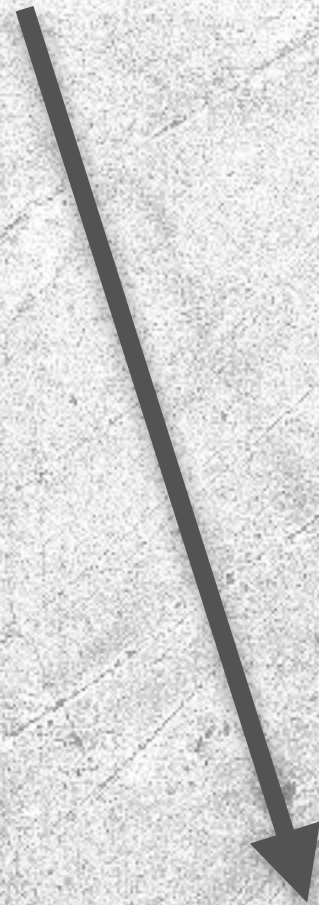
Environmental  
View

Implementation  
View

# Development Process

**From Waterfall**

Completeness  
Documentation



**To Agile and Lean**

Iteration  
Conversation

# Use Case

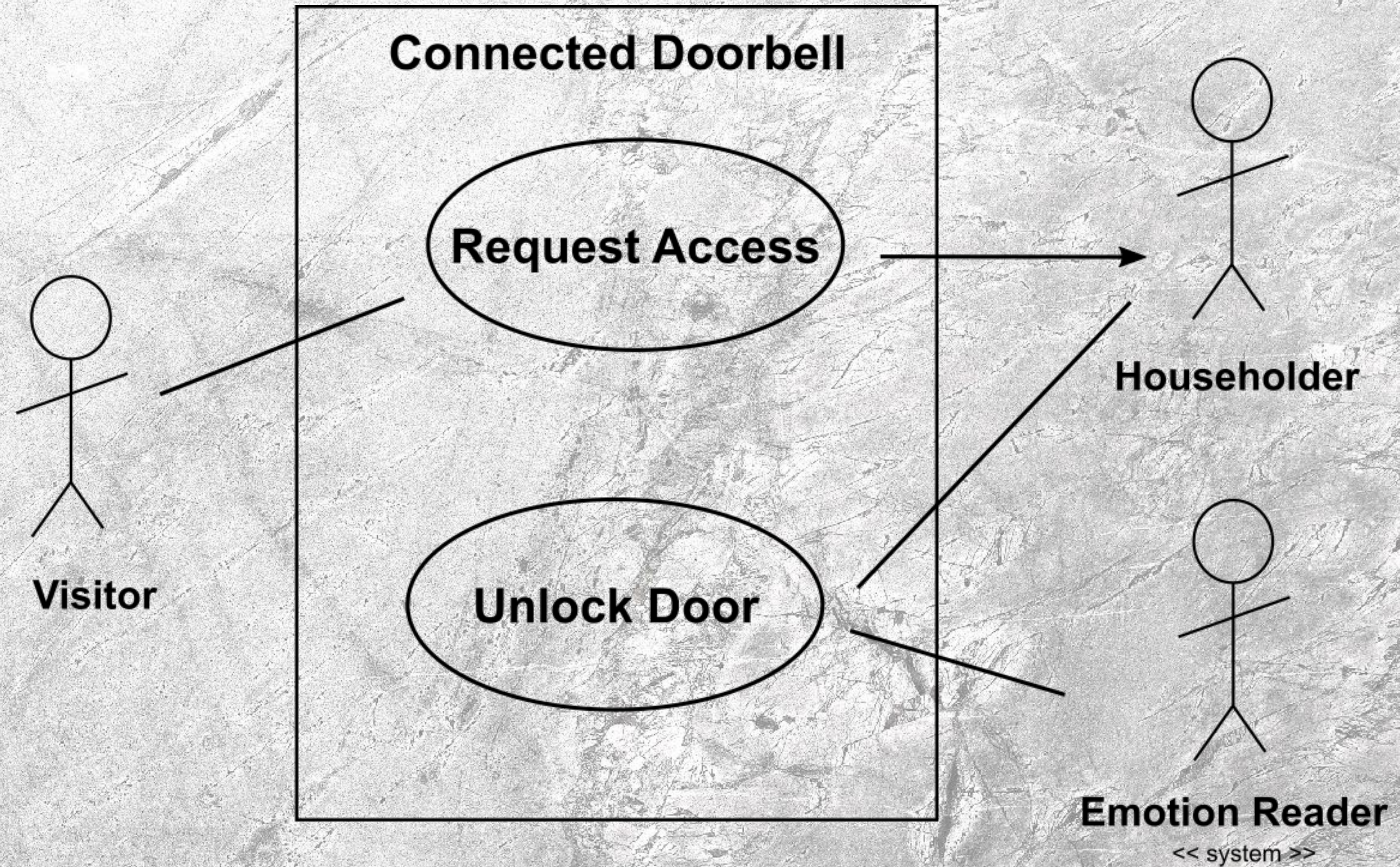


# Use Case

- Goal: Enter the house
- Preconditions: someone at the door
- Successful end condition: authorised, door open
- Failed end condition: declined, door closed
- Primary actors: visitor
- Secondary actors: householder, system
- Trigger: presence
- Main flow: request access, unlock the door
- Extensions: notify at home, notify on the go

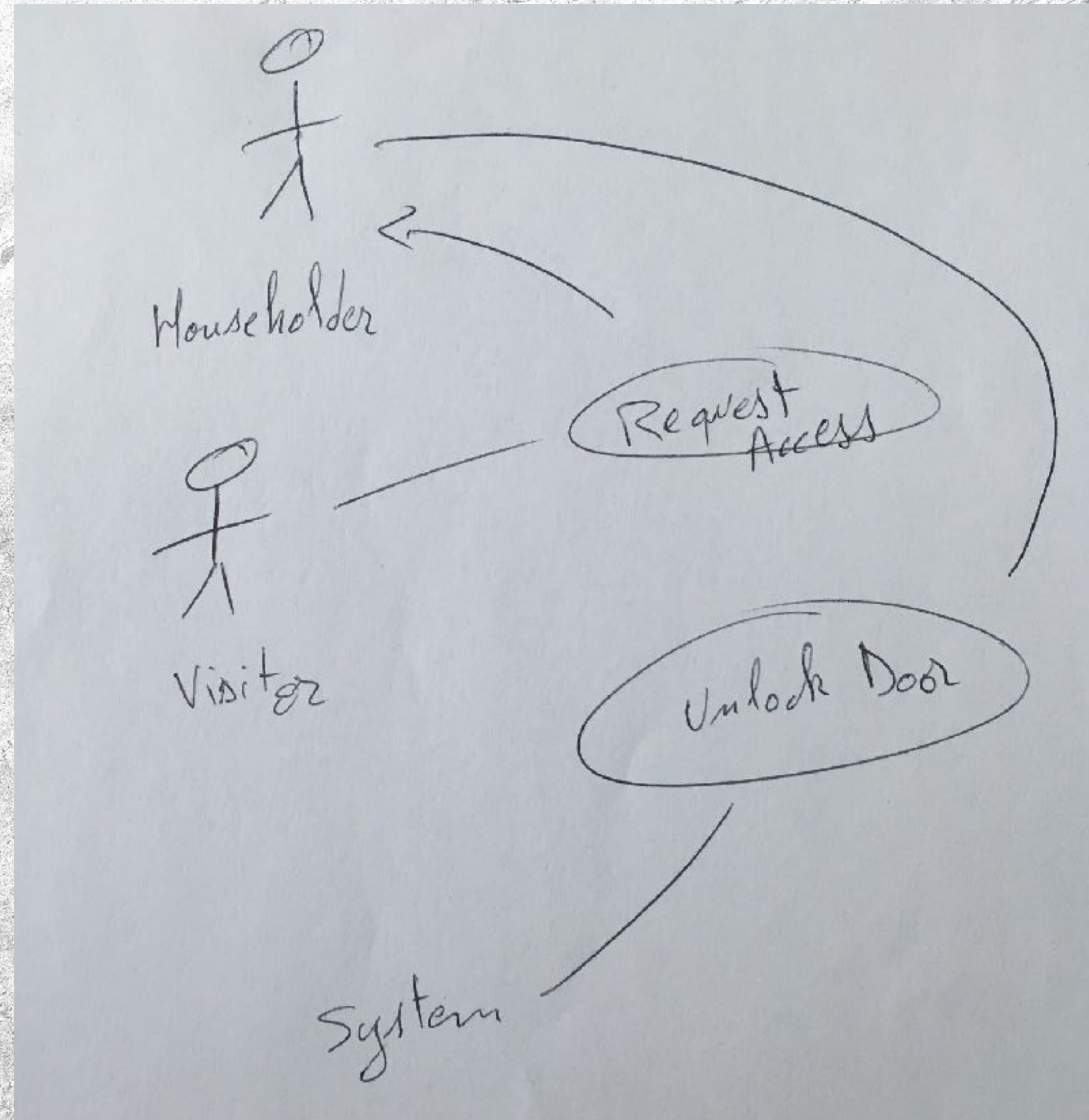
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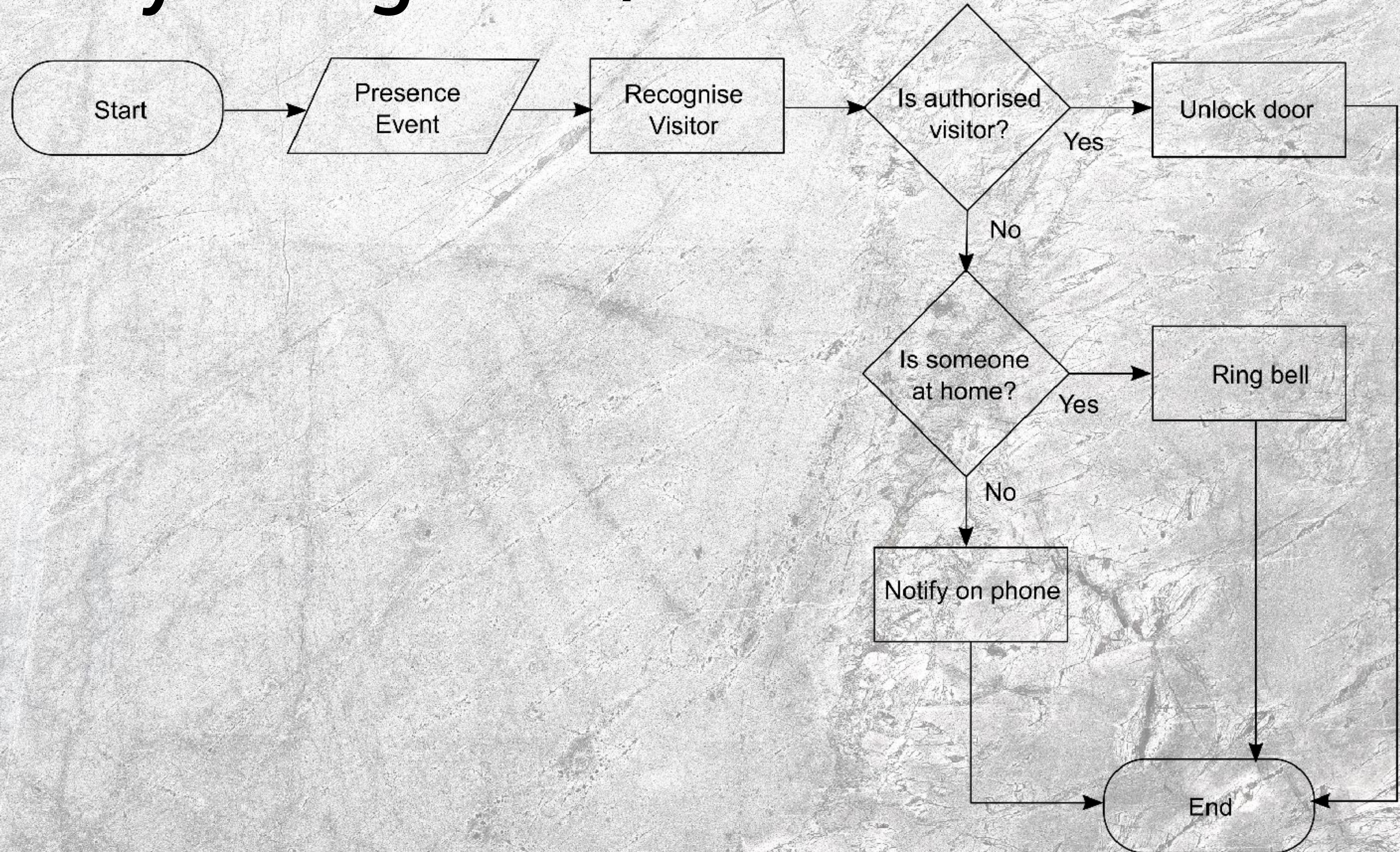


# Use Case Diagram

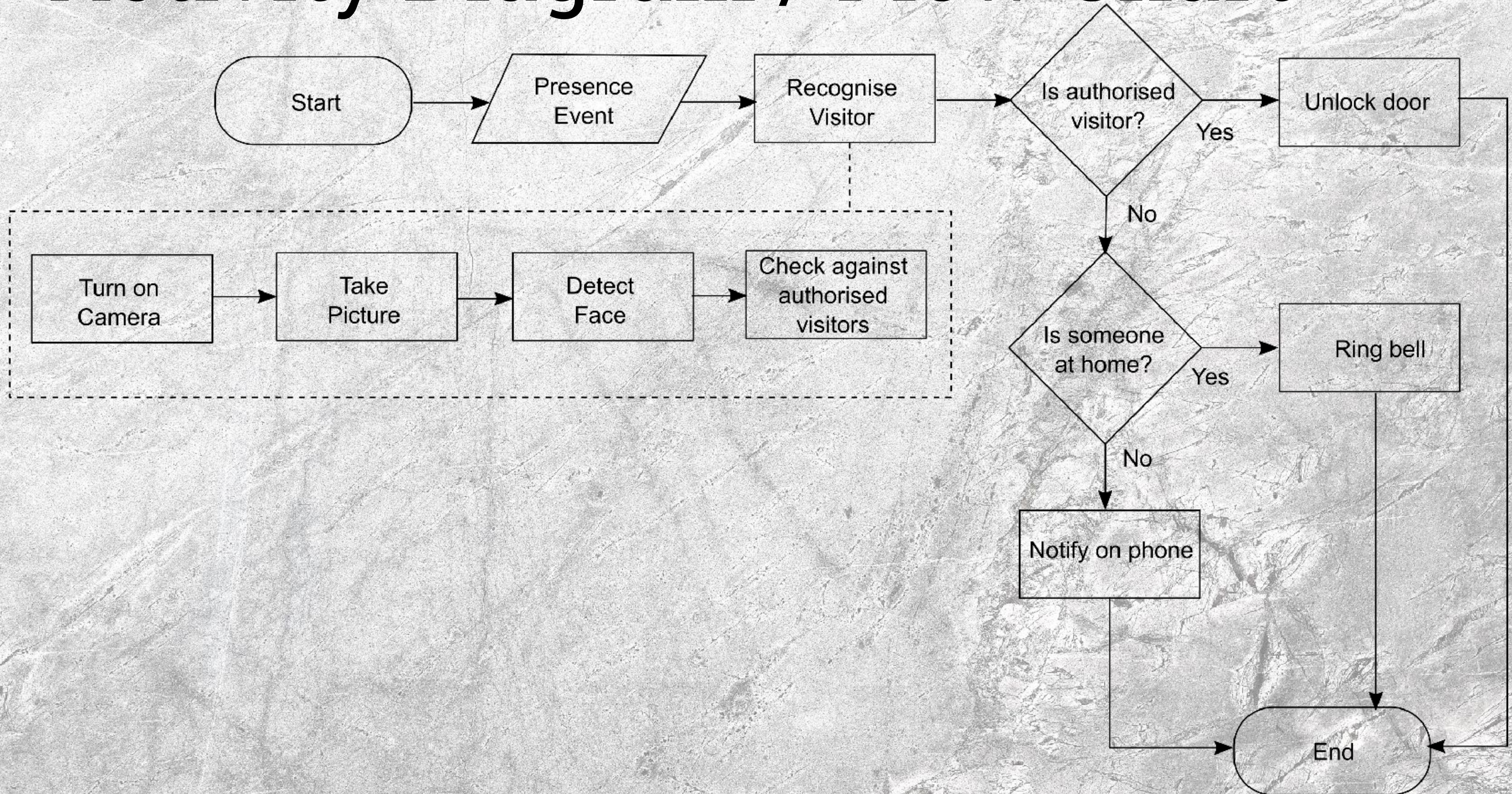
- Start with a goal
- With simple, unambiguous narrative
- No technology nor UI
- Capture the envision behaviour

# Activity Diagram / Flow Chart

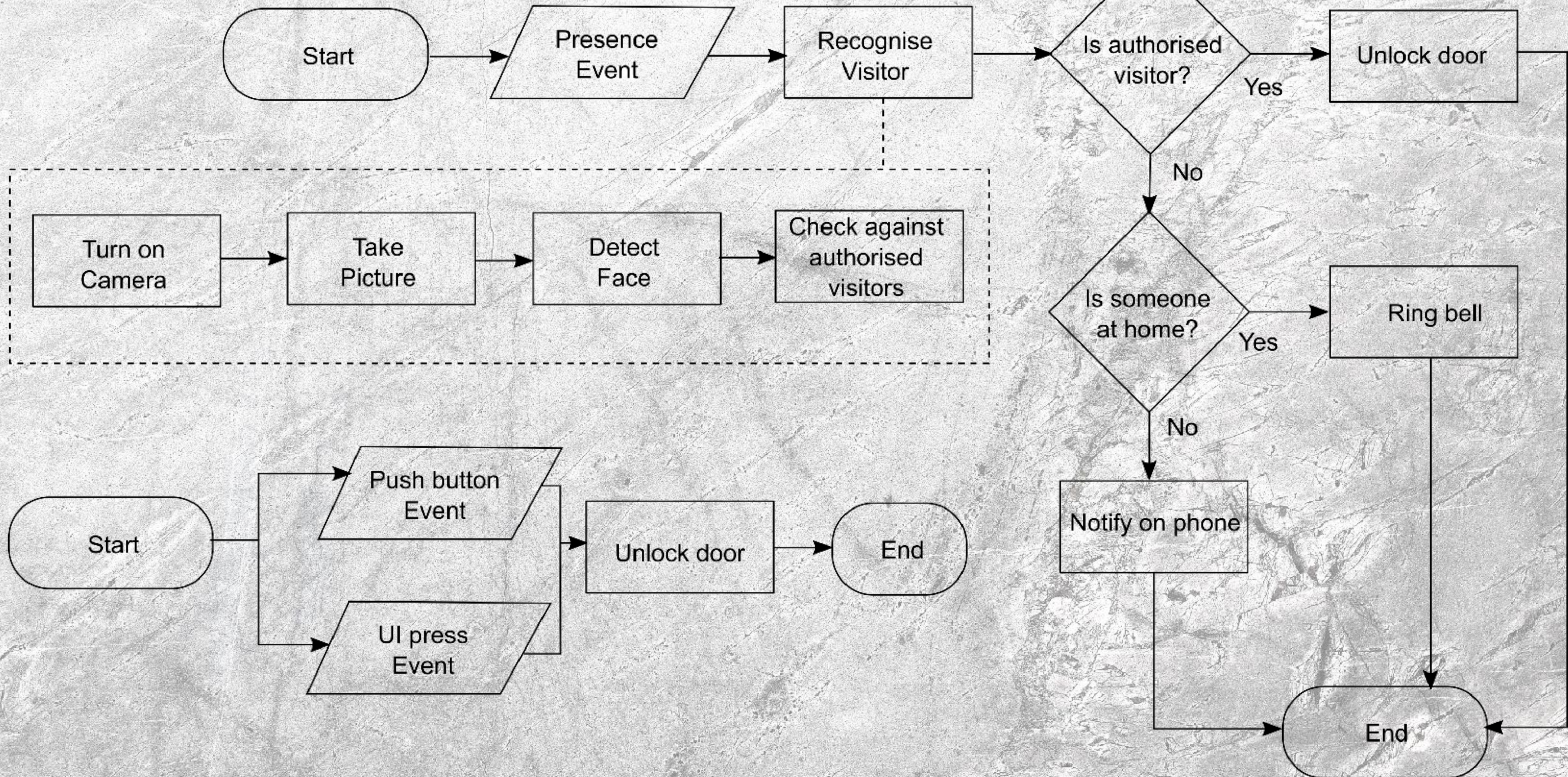
# Activity Diagram / Flow Chart



# Activity Diagram / Flow Chart



# Activity Diagram / Flow Chart





# Flow chart shapes



## Terminator

Indicates the beginning or end of a program flow in your diagram.



## Process

Indicates any processing function.



## Decision

Indicates a decision point between two or more paths in a flowchart.



## Delay

Indicates a delay in the process.



## Data

Can represent any type of data in a flowchart.



## Document

Indicates data that can be read by people, such as printed output.



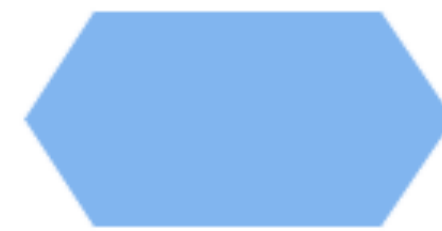
## Multiple documents

Indicates multiple documents.



## Subroutine

Indicates a predefined (named) process, such as a subroutine or a module.



## Preparation

Indicates a modification to a process, such as setting a switch or initializing a routine.



## Display

Indicates data that is displayed for people to read, such as data on a monitor or projector screen.



## Manual input

Indicates any operation that is performed manually (by a person).



## Manual loop

Indicates a sequence of commands that will continue to repeat until stopped manually.



## Loop limit

Indicates the start of a loop. Flip the shape vertically to indicate the end of a loop.



## Stored data

Indicates any type of stored data.



## Connector

Indicates an inspection point.



## Off-page connector

Use this shape to create a cross-reference and hyperlink from a process on one page to a process on another page.



## Off-page connector



## Off-page connector



## Off-page connector



## Or

Logical OR



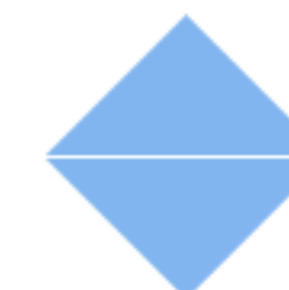
## Summing junction

Logical AND



## Collate

Indicates a step that organizes data into a standard format.



## Sort

Indicates a step that organizes items list sequentially.



## Merge

Indicates a step that combines multiple sets into one.



## Database

Indicates a list of information with a standard structure that allows for searching and sorting.

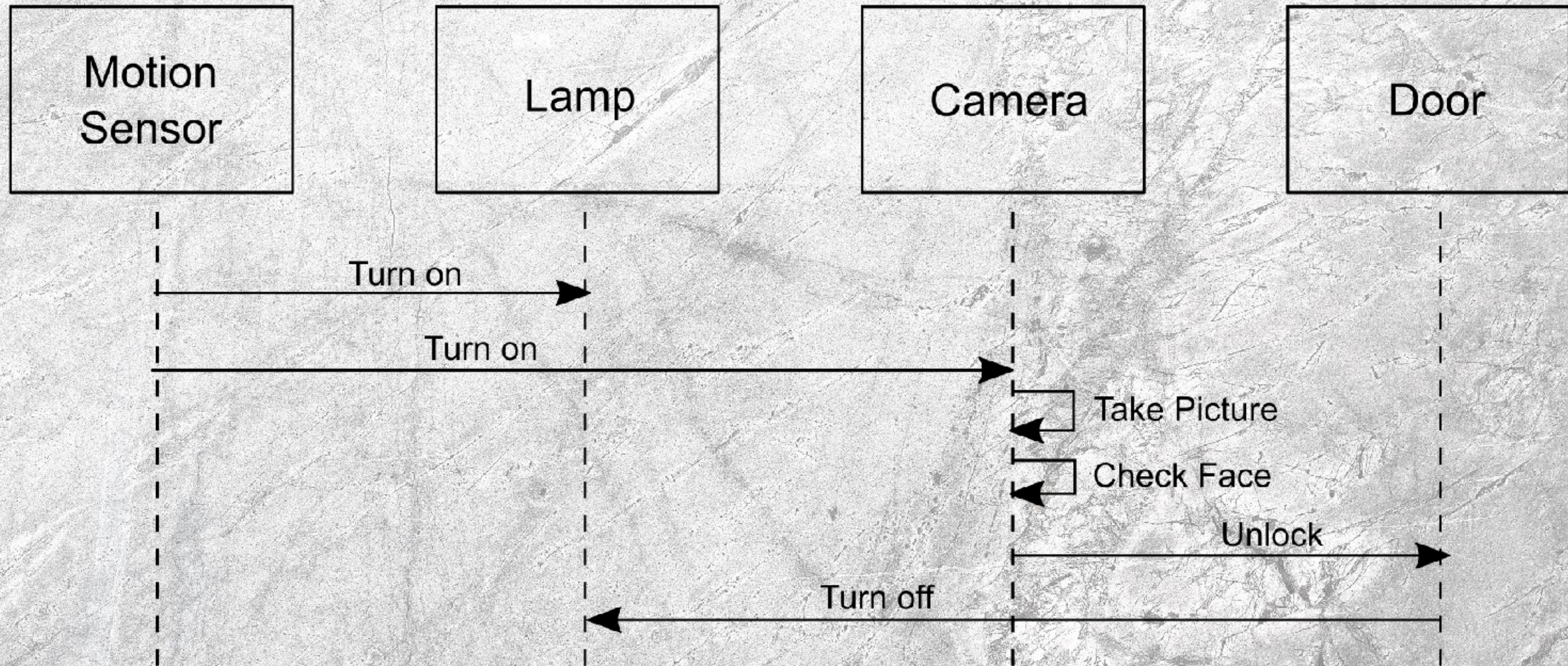


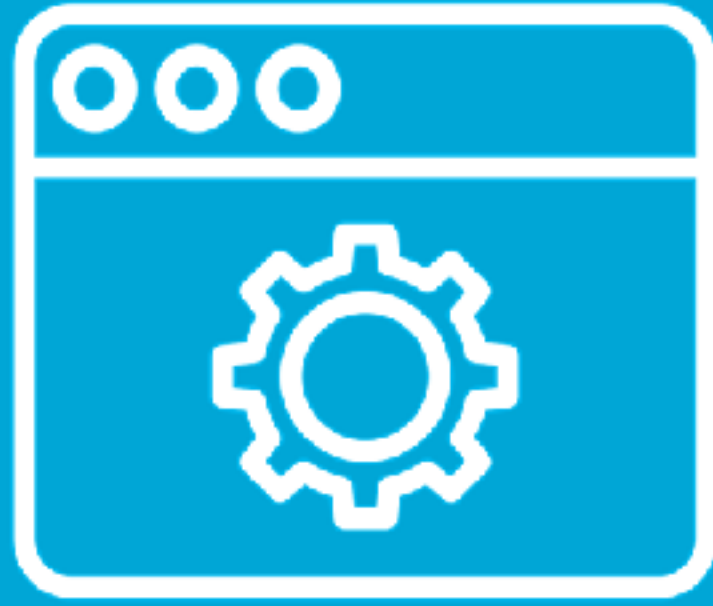
## Internal storage

Indicates an internal storage device.

# Sequence Diagram

# Sequence Diagram

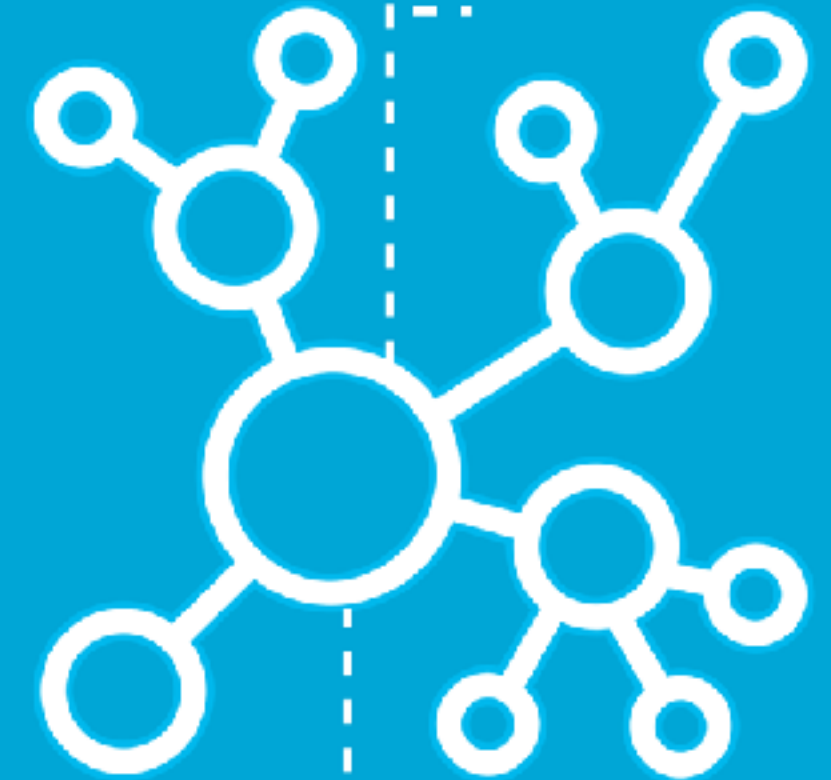




IOB22

# Digital Product Development

10100  
00101  
10100





## Credits

Background: <https://www.pexels.com/photo/grey-wall-2117937/>

Music: <https://www.bensound.com>

# IOB22

## Digital Product Development

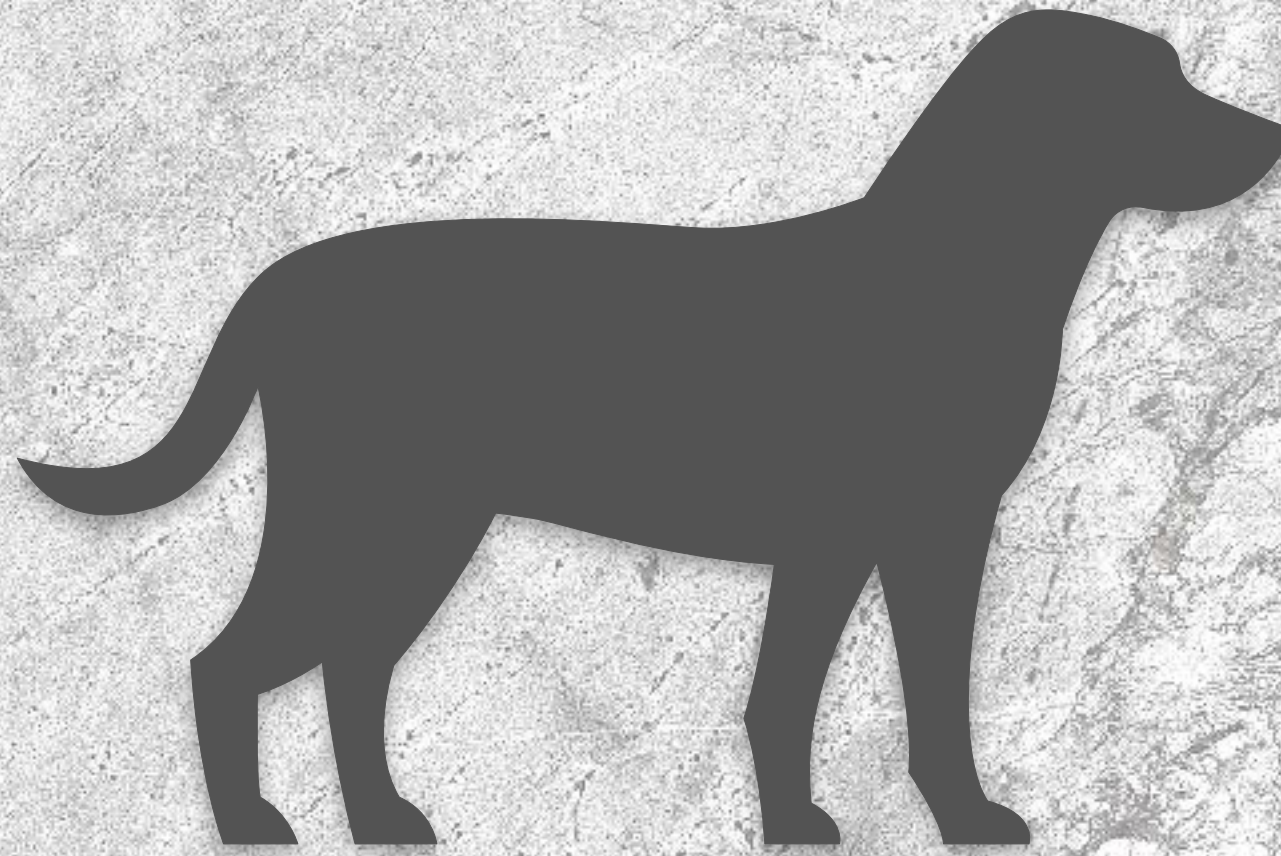
## Module 5 Software



By Jacky Bourgeois

- What are Object-oriented and event-driven paradigms?

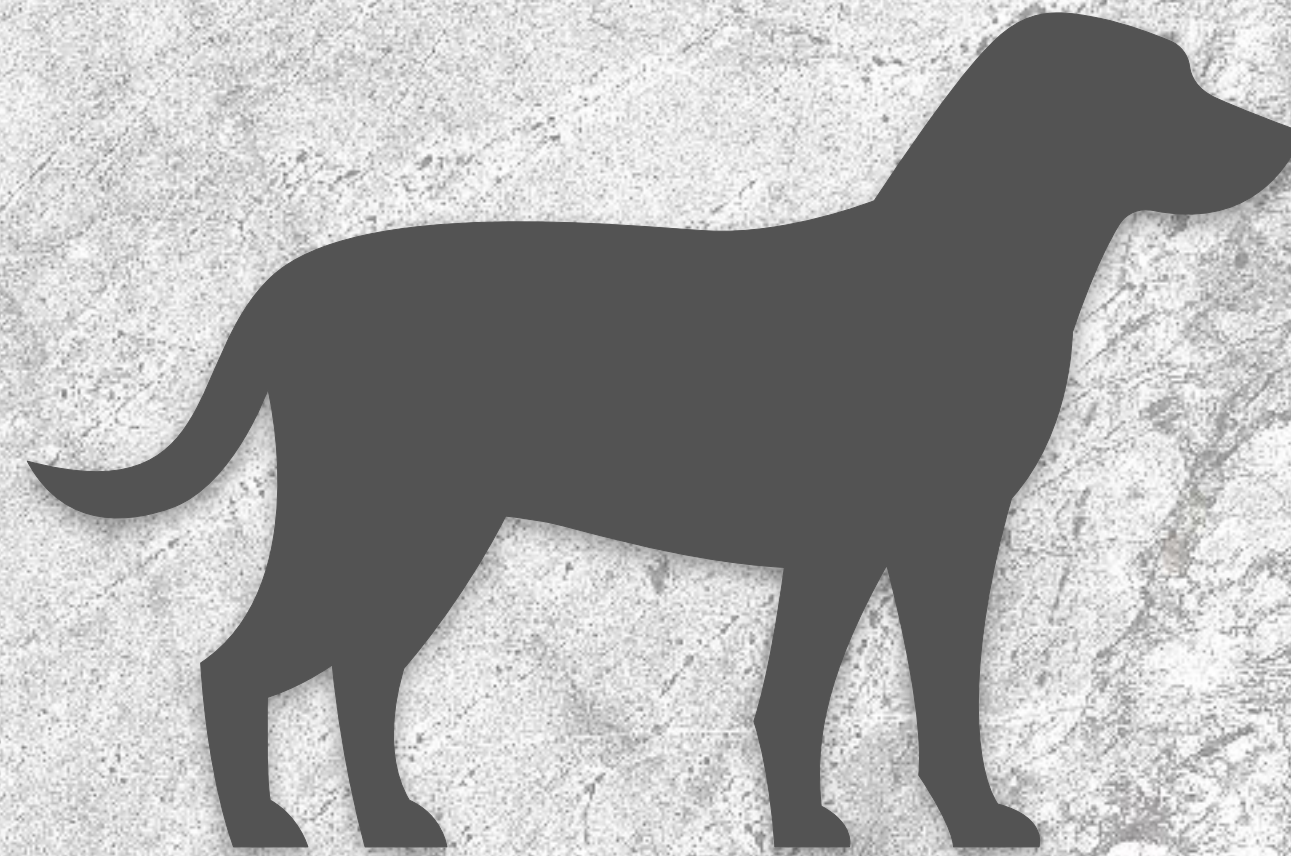
# Objects



# Objects

States

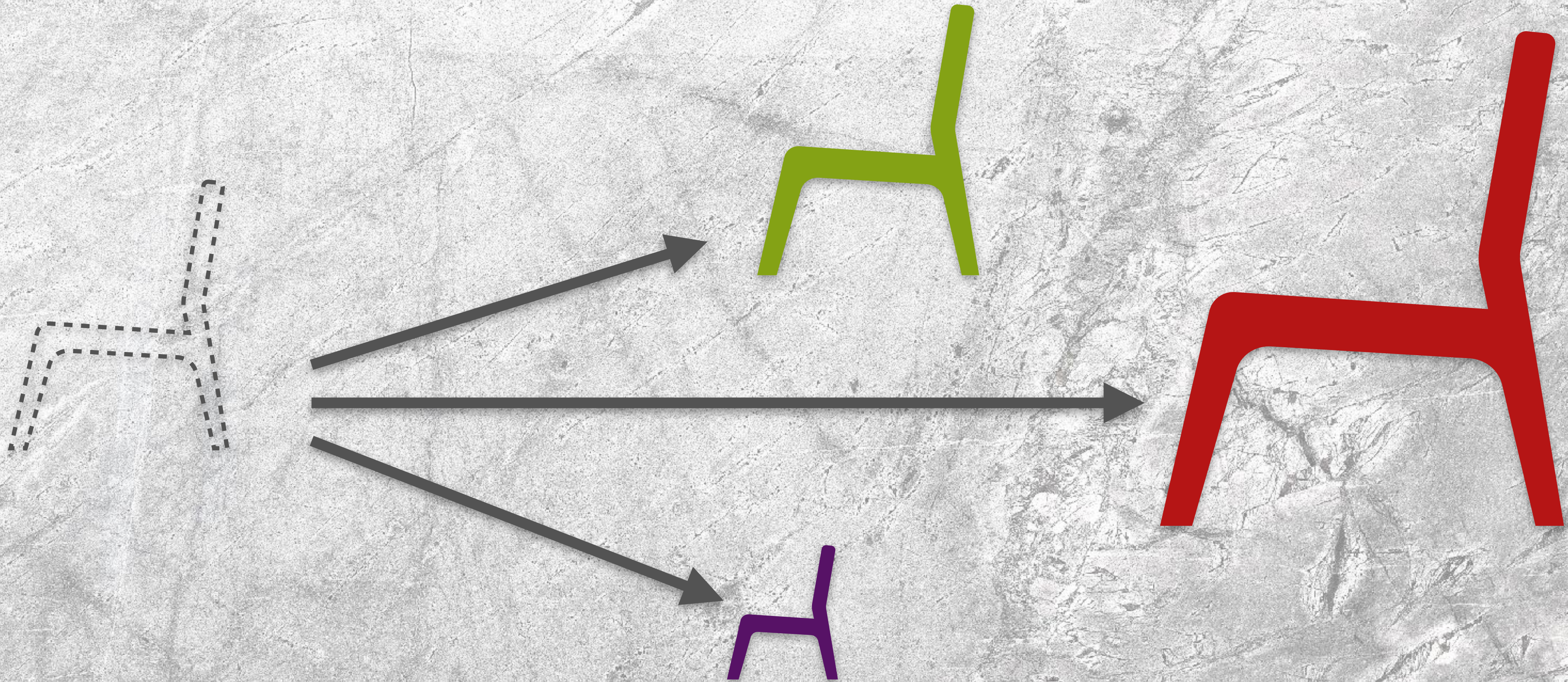
Behaviours





# Class

Object specification, the mould of objects



# Object-Oriented Principles

- Abstraction
- Encapsulation
- Modularisation
- Hierarchy

# Object-Oriented Design

- What's in it for designers?

# CRC Cards

Class	
Responsibility	Collaborators

# CRC Cards

Doorbell	
Turn ON/OFF Change tune	Push button

Camera	
Turn ON/OFF Recognise Emotion	Motion Sensor Door

# CRC Cards

Device	
Turn ON/OFF	

Doorbell	
Change tune	Push button

Camera	
Recognise Emotion	Motion Sensor Door

# Event-Driven Design

# Event-Driven Design



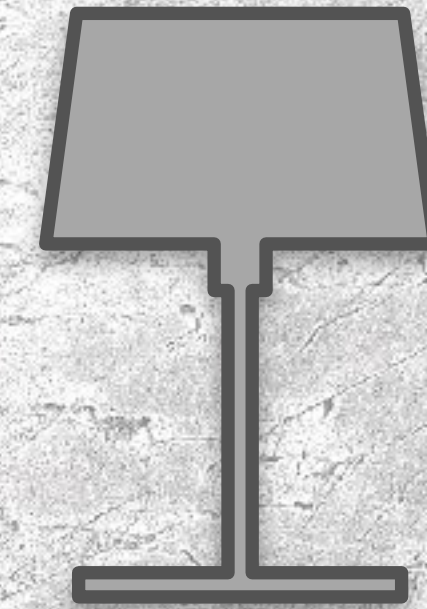
Publisher  
Motion Sensor



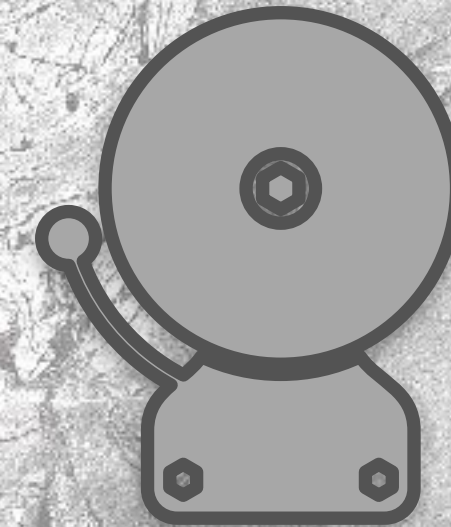
Event Manager



Subscribers



Lamp



Bell



# Event-Driven Advantages

- More efficient
- More reactive
- Separates concerns
- More Dynamic