Automate your friend’s home

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Scenario

Our friend

- Wealthy
- Young
- Modern
- Tech-savvy

Scenario

- Inherited a huge house
- Lives alone
- Wants to earn some extra money by renting bedrooms out
  - Mostly short-term
  - Using an online platform like Airbnb

Goals

- Simplify new arrivals
- Improve the quality of living guests
- Managing shared resources
- Enforce the house rules
- Enhance security

Work packages

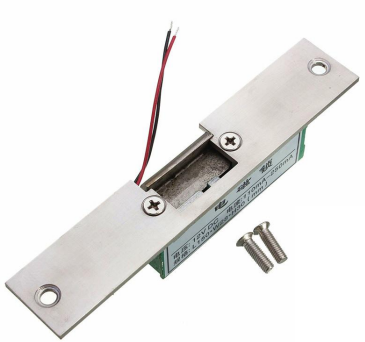
Security - Doors

- Introduce access control using NFC cards
- Only let guests access rooms they are allowed to
  - Do not let them enter other guest’s room or private rooms
  - Invalidate their access after their stay
- Remotely open the doors, when they arrive

Security - Doors

Hardware

- Electrical Lock ~ 10.5€
- Wemos D1 Mini ~ 3.5€
- Wemos D1 Relay ~ 1.8€
- NFC Module (MDRC522) ~ 3.3€
- NFC Access Card (Mifare Ultralight) ~ 23.5€/20pcs
- Wires



Security - Doors

Work

- Installing the door locks ~ 10 min
- Connecting the relay and NFC module ~ 20 min
- Setting up the Wemos D1 mini ~ 20 min
- Adding the door lock and NFC module to home assistant ~ 4 min
- Setting up the NFC access card ~ 15 min

Security - Doors

Total (15 doors, 6 cards)

- ~ 310€ hardware costs
- ~ 14.5 hours of work

Security - Cameras & Motion Sensors

- Check situation inside house remotely
- Secure against burglars
  - Movements in empty rooms
- Ensure people adhere the house rules
  - Clean up the kitchen
  - Do not steal

Security - Cameras & Motion Sensors

Hardware

- Wemos D1 Mini ~ 3.5€
- Motion Sensor (HC-SR501) ~ 0.6€
- IP Camera (Xiamo Yi 720p) ~ 35.4€
- Wires

Security - Cameras & Motion Sensors

Xiaomi Yi

- Inexpensive IP camera
- Can be made compatible with custom firmware
- Streams video locally (using HTTP or RTSP)

Security - Cameras & Motion Sensors

Work

- Flashing and configuring the camera ~ 20 min
- Placing the camera ~ 5 min
- Adding the camera to home assistant ~ 5 min
- Connecting the motion sensor ~ 15 min
- Setting up the Wemos ~ 20 min
- Installing the motion sensor ~ 10 min
- Adding the motion sensor to home assistant ~ 5 min


garage
porch
family
kitchen
pdr
pantry
linen
wm
indry
living
entry
porch
study


bed 2
robe
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bed 3
lin
duct
robe
robe
bed 4
duct
pdr
down
bath
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duct
bed 1

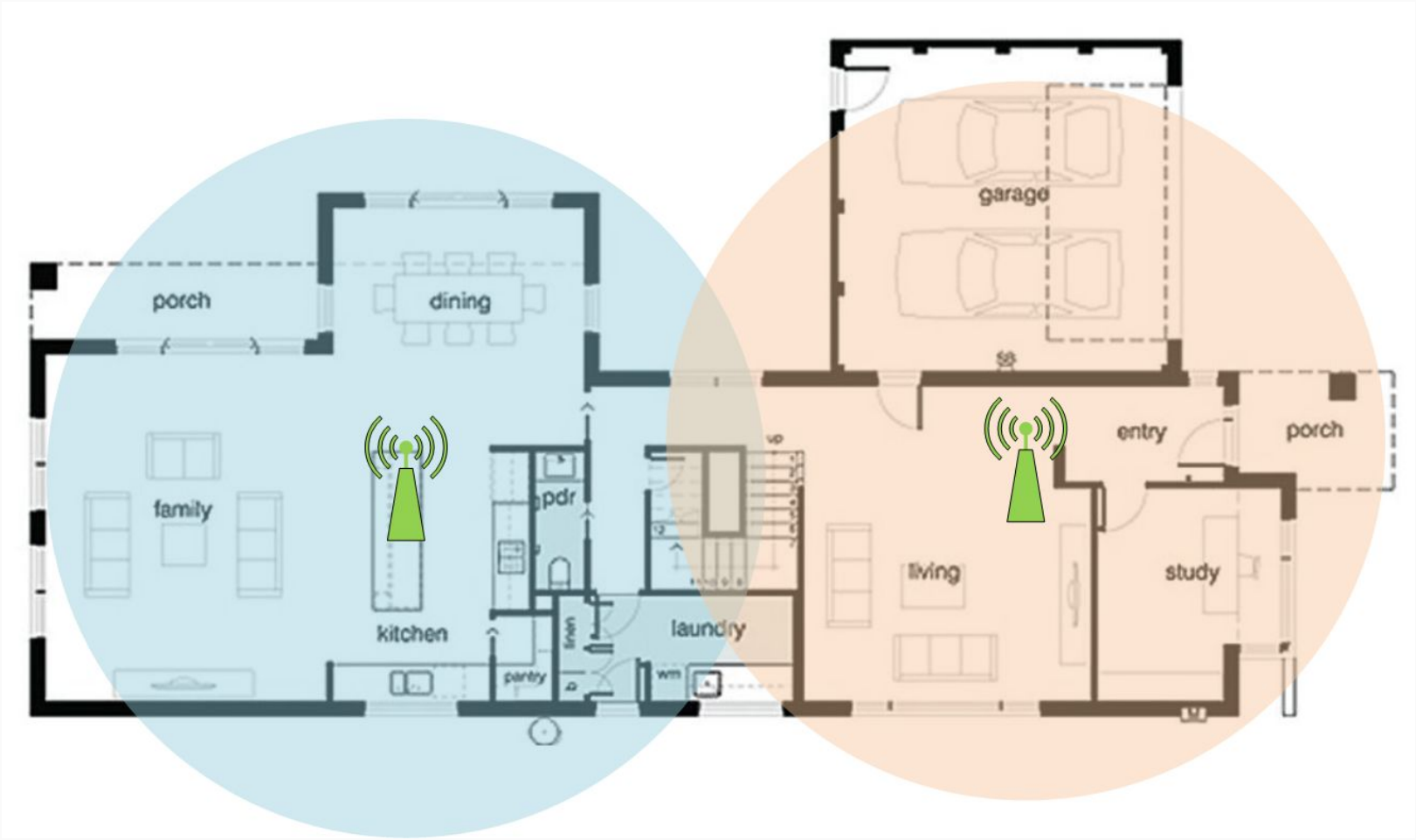
Security - Cameras & Motion Sensors

Total (12 cameras, 15 motion sensors)

- Hardware costs ~ 486.5€
  - ~ 61.5€ for the motion sensors
  - ~ 425€ for the cameras
- Hours of work ~ 18.5 hours
  - ~ 12.5 hours for the motion sensors
  - ~ 6 hours for the cameras

Smart hvac/thermostat/shading

- Smart thermostat
  - WLAN thermostats
- Smart light
  - wemosd1mini with relay shield
- Smart shutter/window
  - wemosd1mini with motor shield and linear actor for controlling window
- Smart ceiling fan
  - Ceiling fan and wemosd1mini with relay shield
- Temperature sensor and humidity sensor
  - Arduino temperature and humidity sensor


porch
dining
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kitchen
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porch
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bed 2
robe
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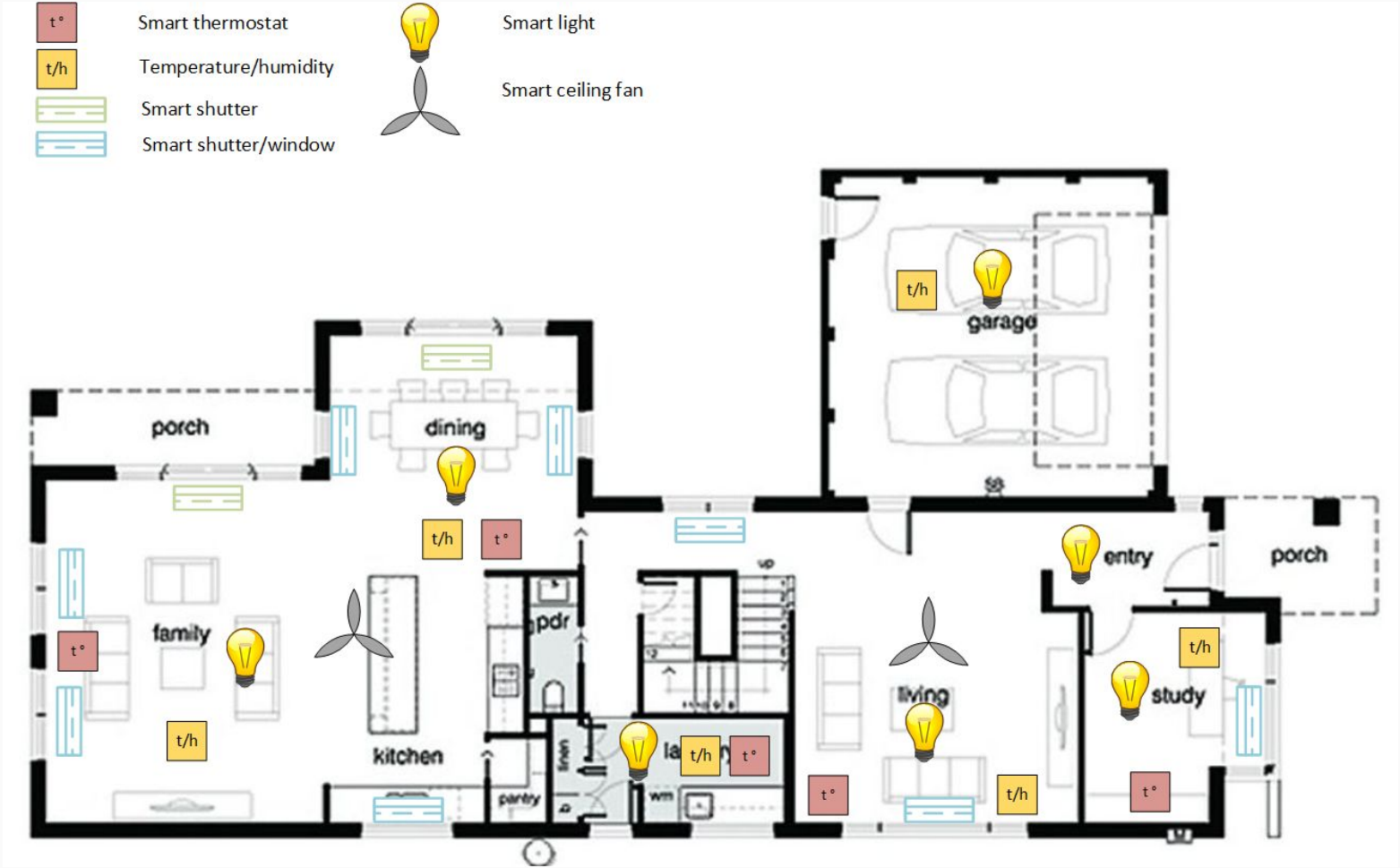
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Smart thermostat
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Temperature/humidity
Smart shutter
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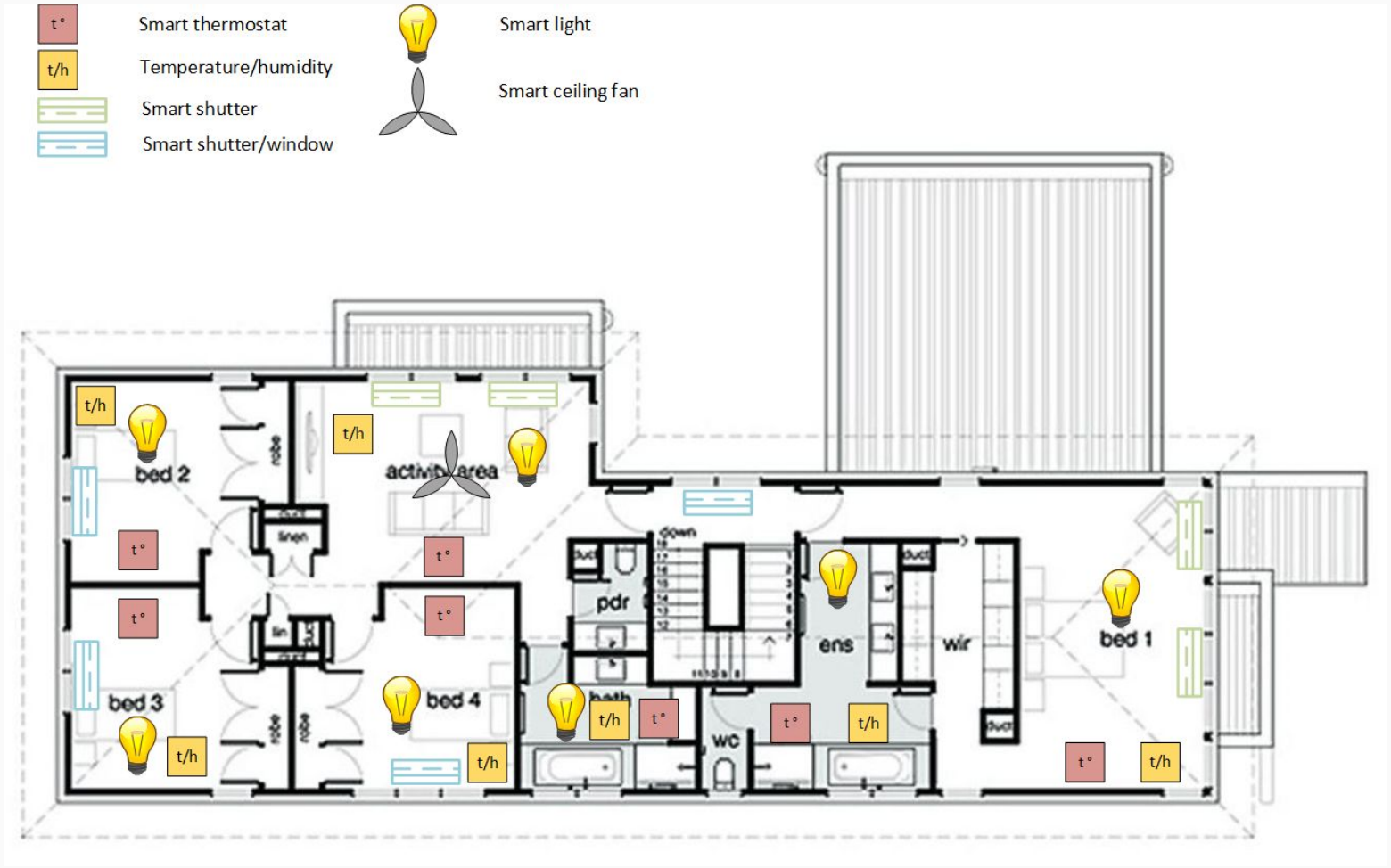
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Smart hvac/thermostat/shading

- **Hardware costs ~ 1280.8€**
  - Smart thermostats ~ 570€
  - Smart lights ~ 74.2€
  - Smart shutters/windows ~ 273.6€
  - Smart ceiling fan ~ 312.9€
  - Temperature/humidity ~ 9.5€
  - Wires ~ 40.6€
- **Workload ~ 60h**

Entertainment - Media Centers

- Introduce access control to your TV.
- Remotely open the TV and Media Streaming.
- Controlling either with the remote control or with iOS or Android app.
- Allows streaming photos, videos and music stored on the device.

Entertainment - Media Centers

Hardware

- Roku Streaming Stick 55.5 €

Work

- Inserting 1 min
- Installing the app 1 min

Entertainment - Media Centers

Total (8 with 444 Euros in 8 mins)

- 3 in ground floor: 1 in big hall, 1 in the living room, 1 in the study room
- 5 in first floor: 4 in bedrooms, 1 in the activity area.

Security - Noise tracking

- Check situation inside house remotely
- Secure against theft
  - Movements in empty rooms
- Checking on the babies/infants.

Security - Noise tracking

Hardware/Software

- Wemos D1 Mini ~ 3.5€
- Noise Sensor (Arduino KY-038) ~ 0.46 €
- Wires

Security - Noise tracking

Work

- Placing the Noise Sensor ~ 5 min
- Connecting the Noise Sensor to Wemos D1 mini ~ 20 min
- Setting up the Wemos D1 mini ~ 20 min
- Adding the noise sensor to home assistant ~ 5 min

Security - Noise tracking

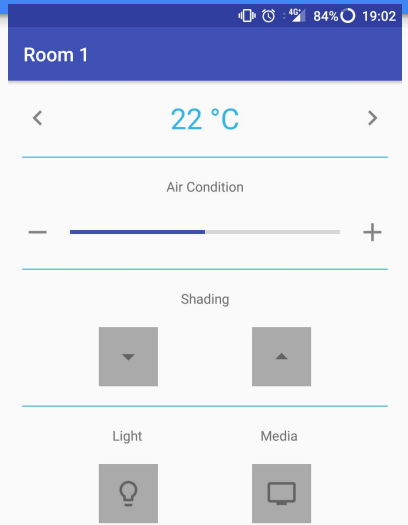
Total (6 Noise trackers 2.76 Euros)

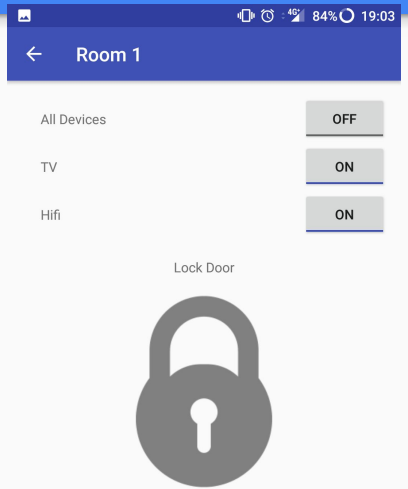
- 2 in ground floor: One in the garage, and one outside
- 4 in first floor: in every bedroom.
- Total hours of work ~ 5:00 hours

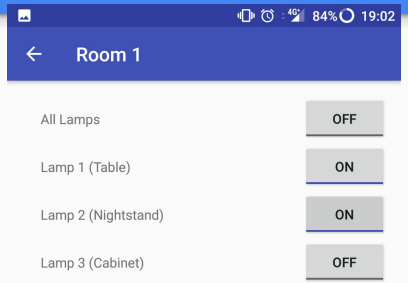
Smart Control

- Amazon Echo Dot
  - Voice control commands (Alexa) interface between user and home automation
- Home Assistant
  - Open source home automation platform (using python 3)
  - Link between the devices and the “remote” controls (Client App, NFC reader,...)
  - Compatible to the Echo Dot
  - Compatible to IFTTT -> creating conditional statements.
    - Eg: if room temperature > 22 °C start AC
  - Compatible with MQTT machine to machine protocol

Smart Control - Client Application







Gadgets

- Smart Buttons
  - Reorder utilities like soap, toilet paper,...
- Smart Washing Machine
  - Wifi control, add clothing during wash process, check status of the washing load
  - unfortunately only able to control with samsung application

Smart Control, Gadgets

Hardware

- 8 x Echo Dot (55€)
  - Family + Dining + Kitchen + Study + 4 x Bedroom
- 6x Smart Button (4.10€)
  - Wemos D1 Mini + Wemos D1 Mini Button Shield
  - 2 buttons per rentable bedroom
- Washing Machine (669€)
  - Laundry room (Floor 1)

Smart Control, Gadgets

Work

- Echo Dot setup ~ 30 min x 8
- Smart Button ~ 25 min x 6
- Washing Machine ~ 30 min
- Client Application ~ 60 h

Smart Control, Gadgets

Total (8 x Echo Dot, 6 x Buttons, Washing Machine, Client Application)

- Hardware costs: 1133.6 €
- Hours of work: 67 h

Summary

- **Overall hardware costs ~ 4951€**
  - Security ~ 796.5€
  - Smart hvac/thermostat/shading ~ 1280.8€
  - Home entertainment ~ 480€
  - Smart control ~ 1133.6€
  - WLAN Routers ~ 260€
  - Server ~ 1000€
- **Overall workload ~ 168h**
  - Security ~ 33h
  - Smart hvac/thermostat/shading ~ 60h
  - Home entertainment ~ 8h
  - Smart control ~ 67h

Questions?

Thanks