# AUTOMATIC DOOR LOCK SYSTEM

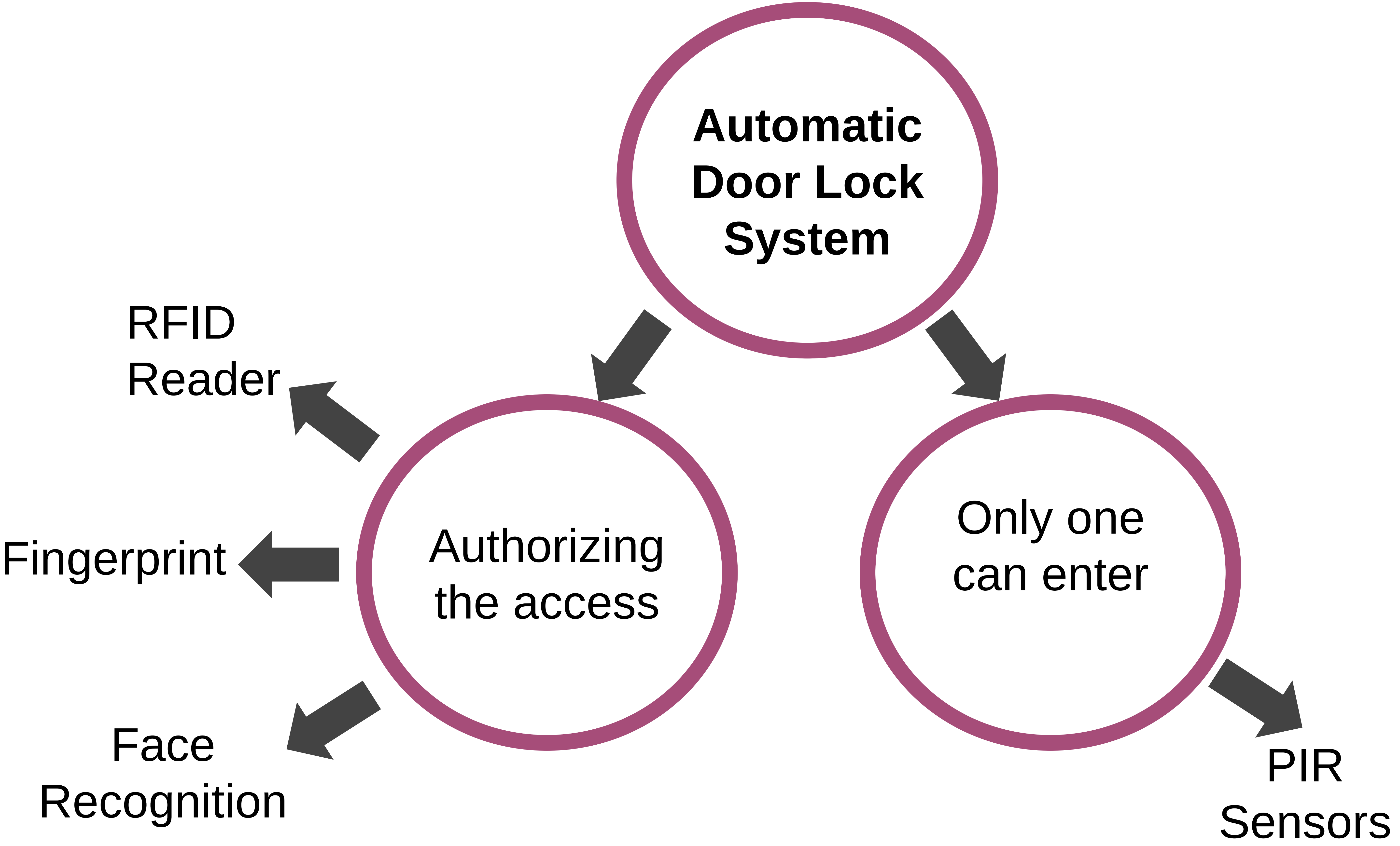
By Group 4

E/15/119
E/15/202
E/15/208

# PROBLEM

- Unauthorized access to property
- Avoid entries behind others
- Maintain different security levels
- View entry details

# SOLUTION



**Automatic Door Lock System**

Authorizing the access

Only one can enter

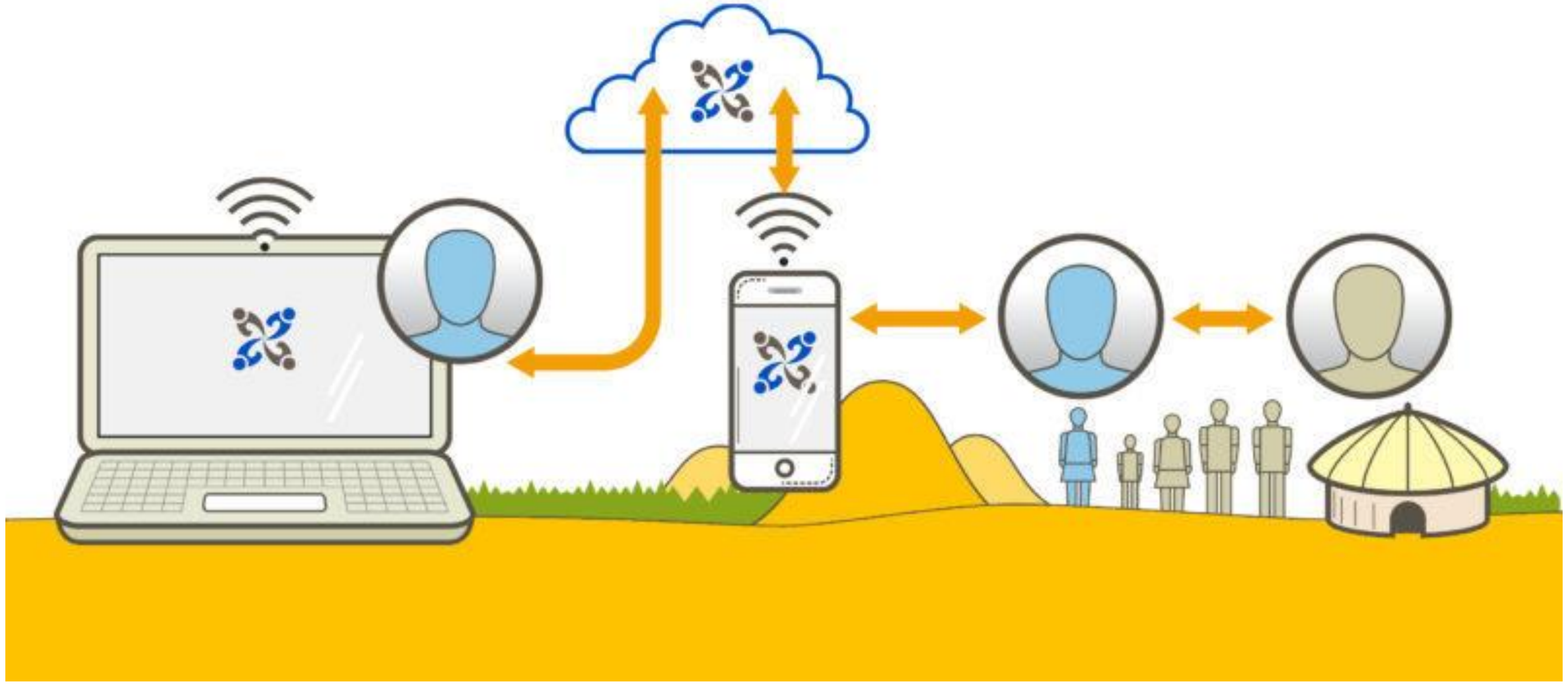
RFID Reader

Fingerprint

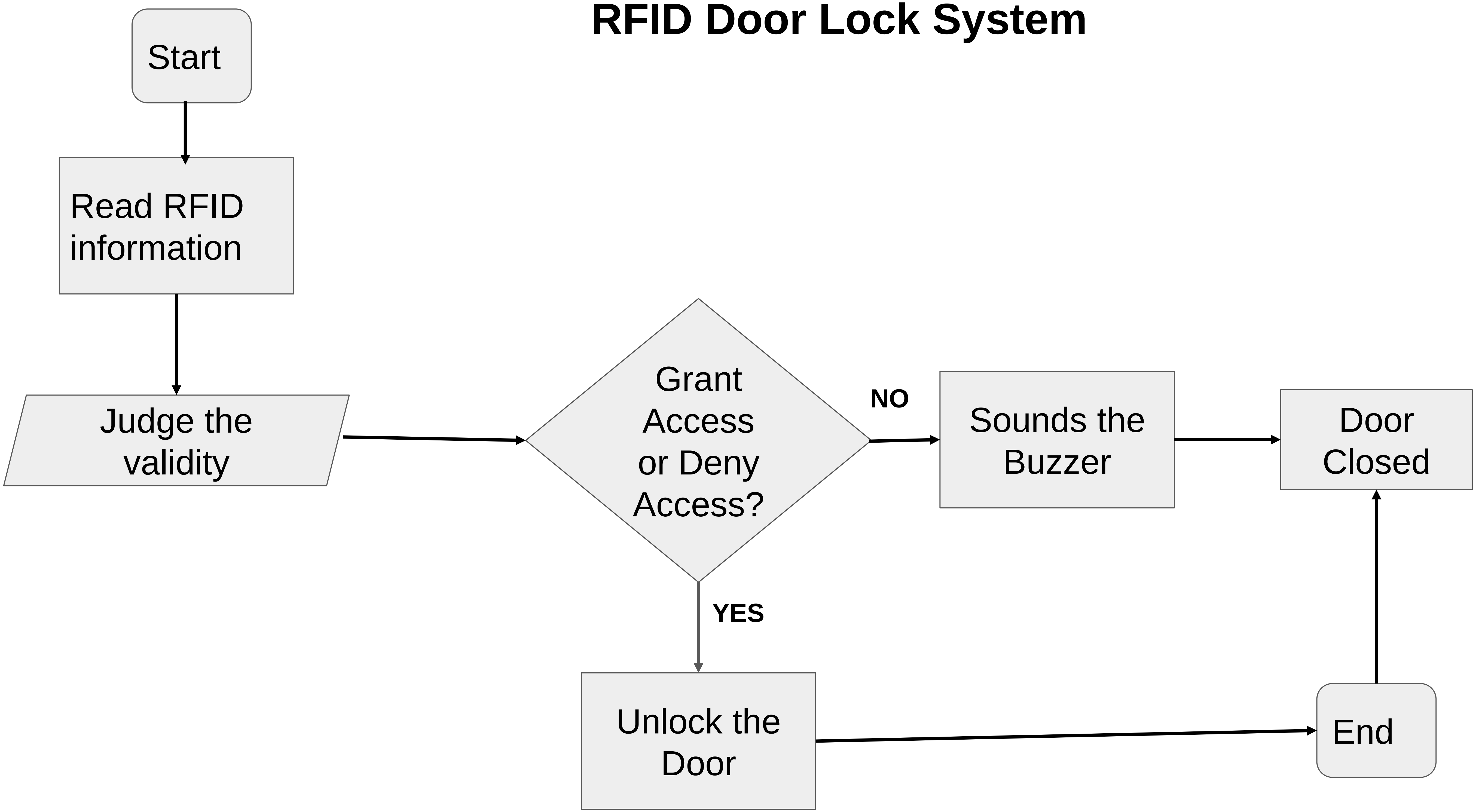
Face Recognition

PIR Sensors

# DATA FLOW AND INFRASTRUCTURE



# RFID Door Lock System



Start

Read RFID information

Judge the validity

Grant Access or Deny Access?

NO

Sounds the Buzzer

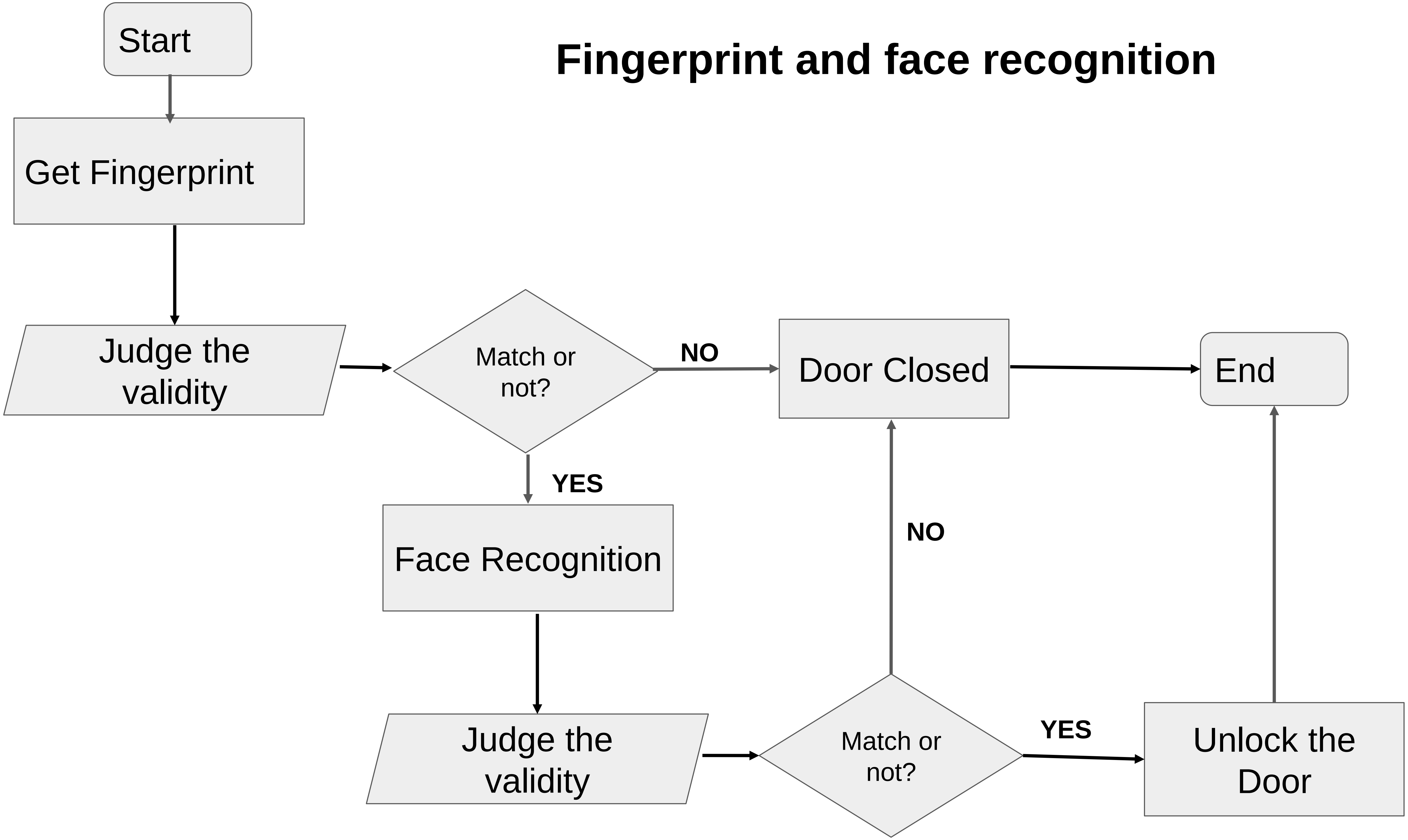
Door Closed

YES

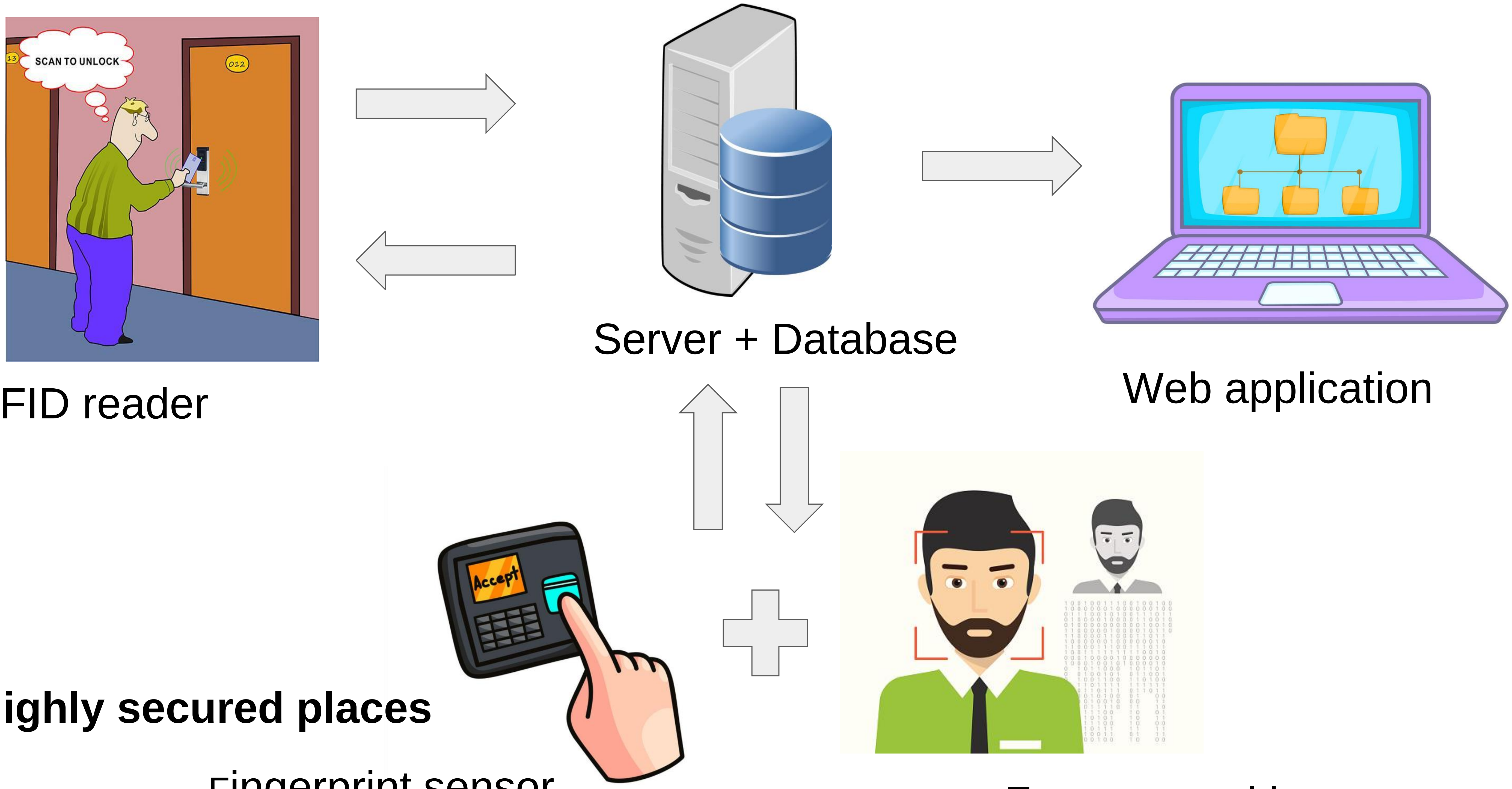
Unlock the Door

End

# Fingerprint and face recognition



# Block Diagram



RFID reader

Server + Database

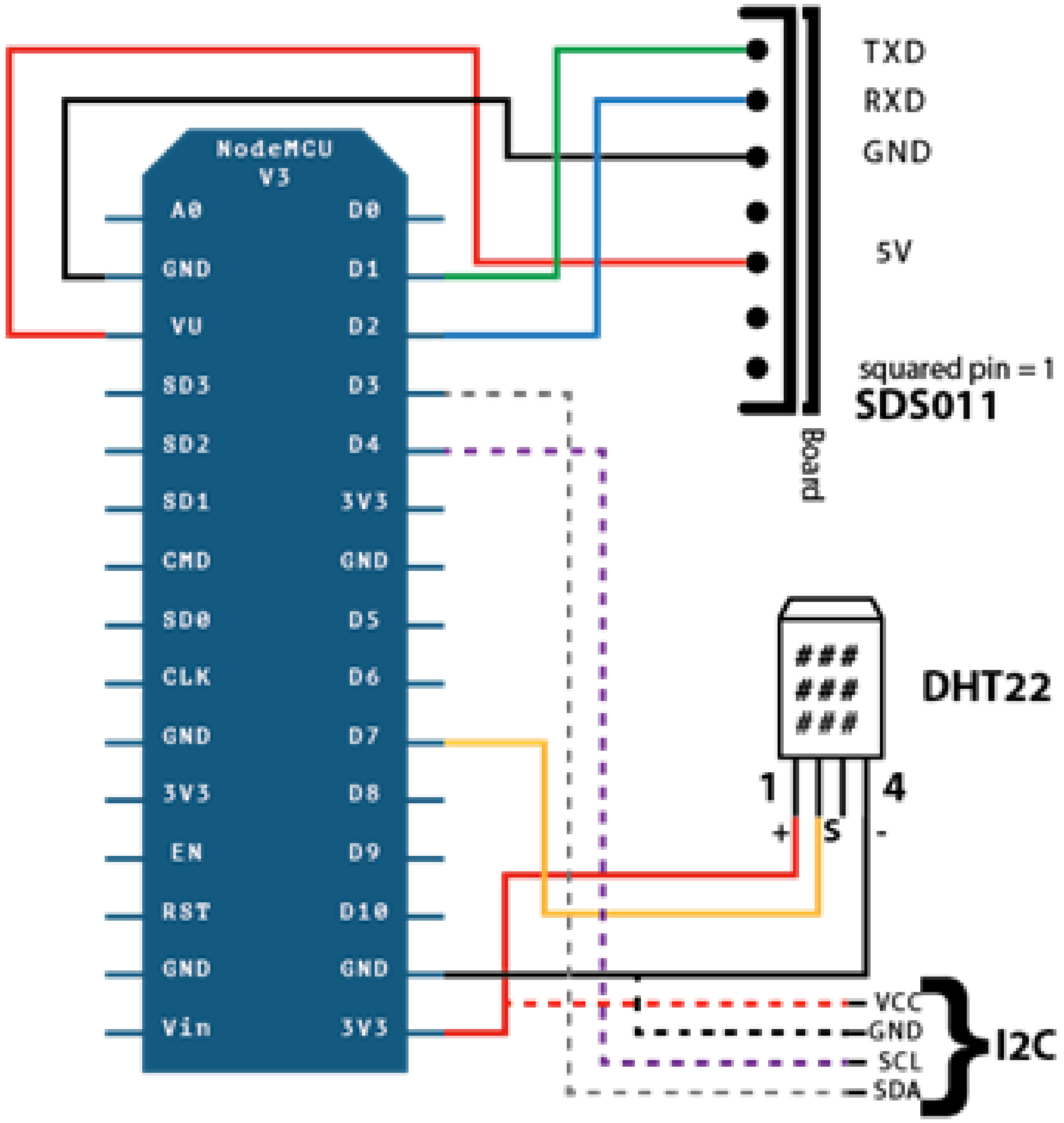
Web application

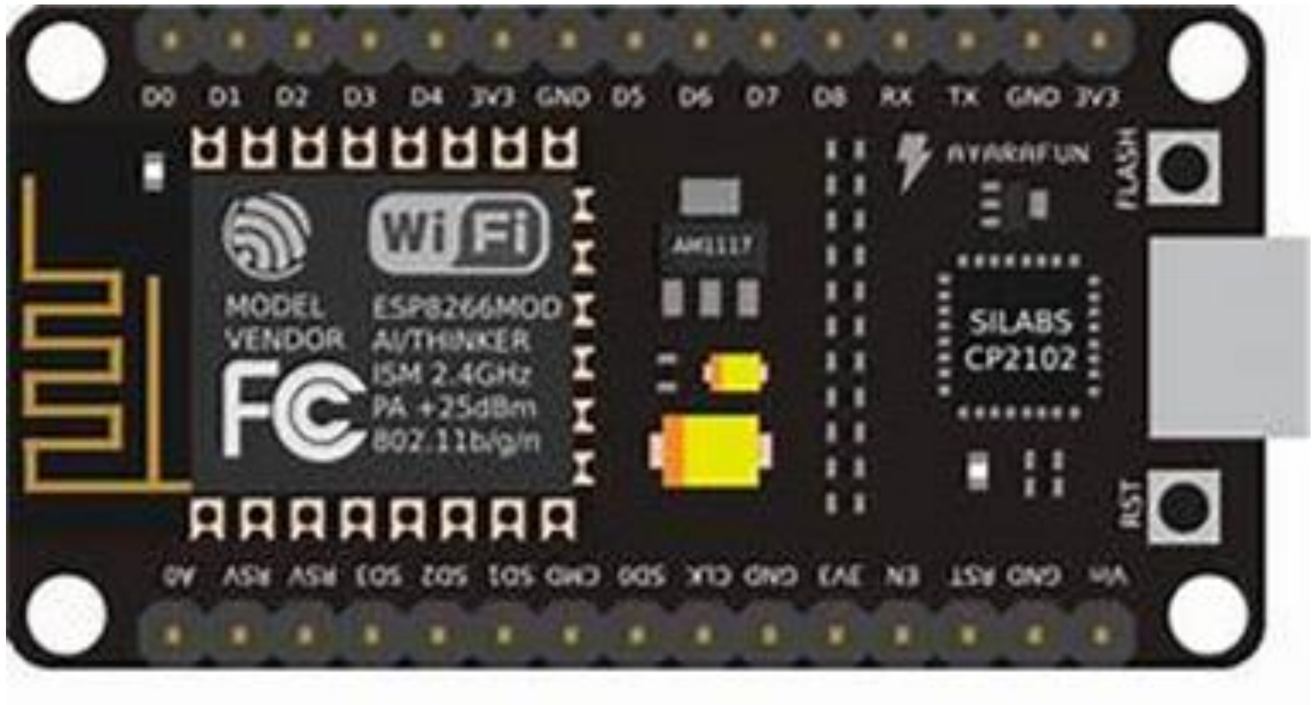
**Highly secured places**

Fingerprint sensor

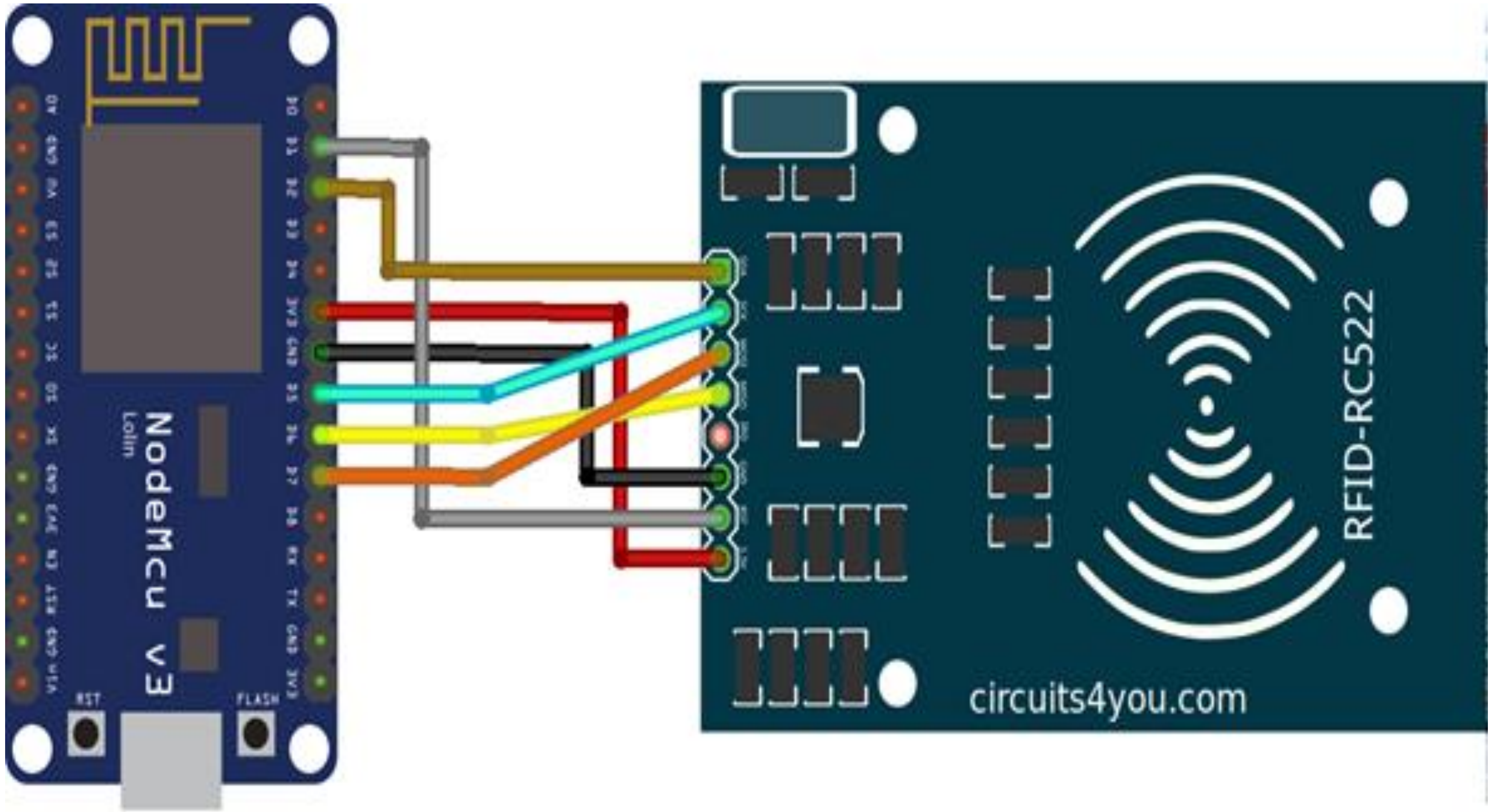
Face recognition

# NodeMCU


NodeMCU
V3
A0
GND
VU
SD3
SD2
SD1
CMD
SD0
CLK
GND
3V3
EN
RST
GND
Vin
D0
D1
D2
D3
D4
3V3
GND
D5
D6
D7
D8
D9
D10
GND
3V3
TXD
RXD
GND
5V
squared pin = 1
SDS011
Board
DHT22
###
###
###
1
4
+
S
-
VCC
GND
SCL
SDA
I2C

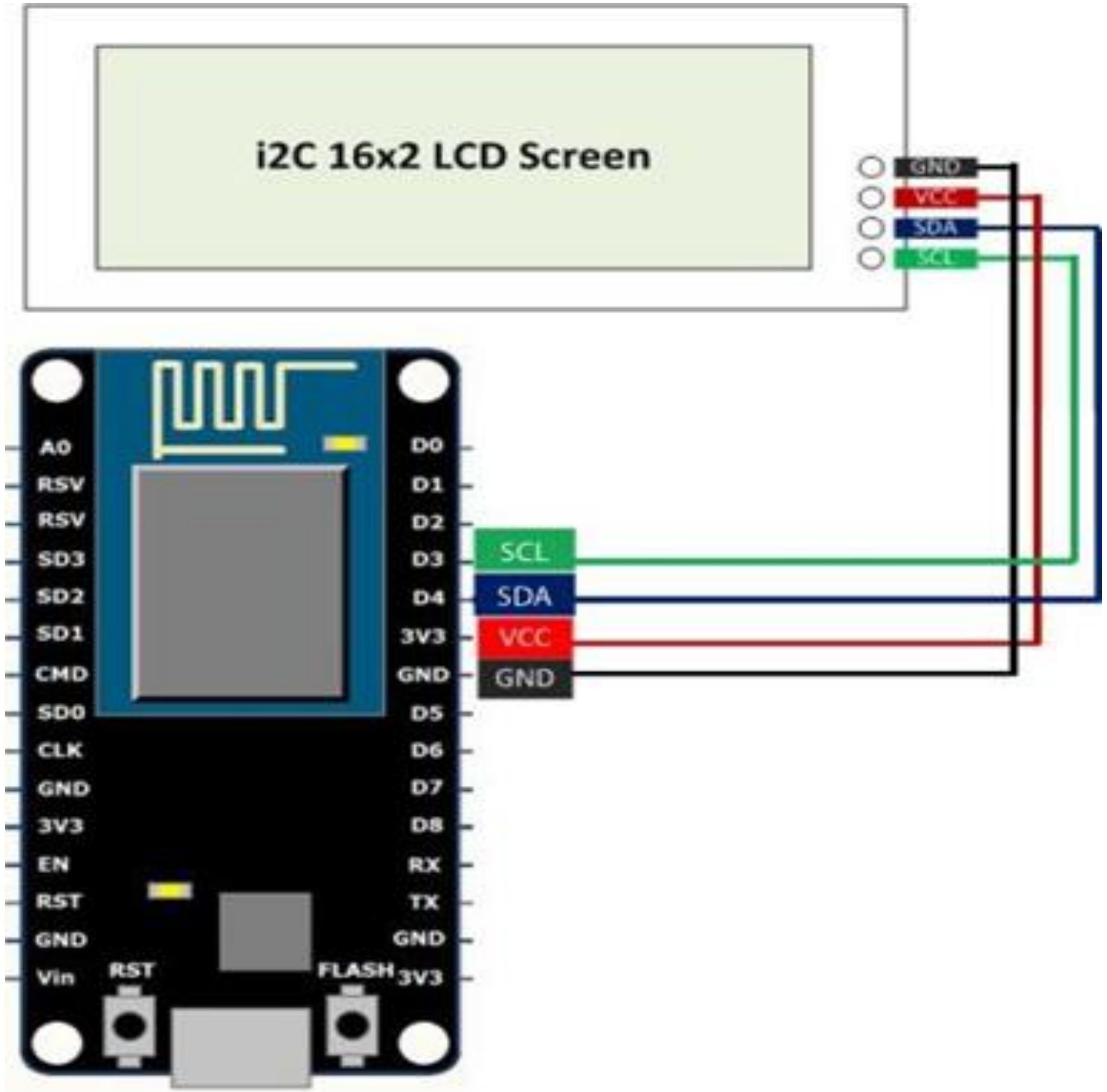

D0 D1 D2 D3 D4 3V3 GND D5 D6 D7 D8 RX TX GND 3V3
Wi Fi
MODEL ESP8266MOD
VENDOR AI/THINKER
ISM 2.4GHz
PA +25dBm
802.11b/g/n
AM1117
AYARAFUN
FLASH
SILABS
CP2102
RST
A0 RSV RSV SD3 SD2 SD1 CMD SD0 CLK GND 3V3 EN RST GND Vin

# RFID Reader


NodeMcu v3
Lolin
RST
FLASH
RFID-RC522
circuits4you.com

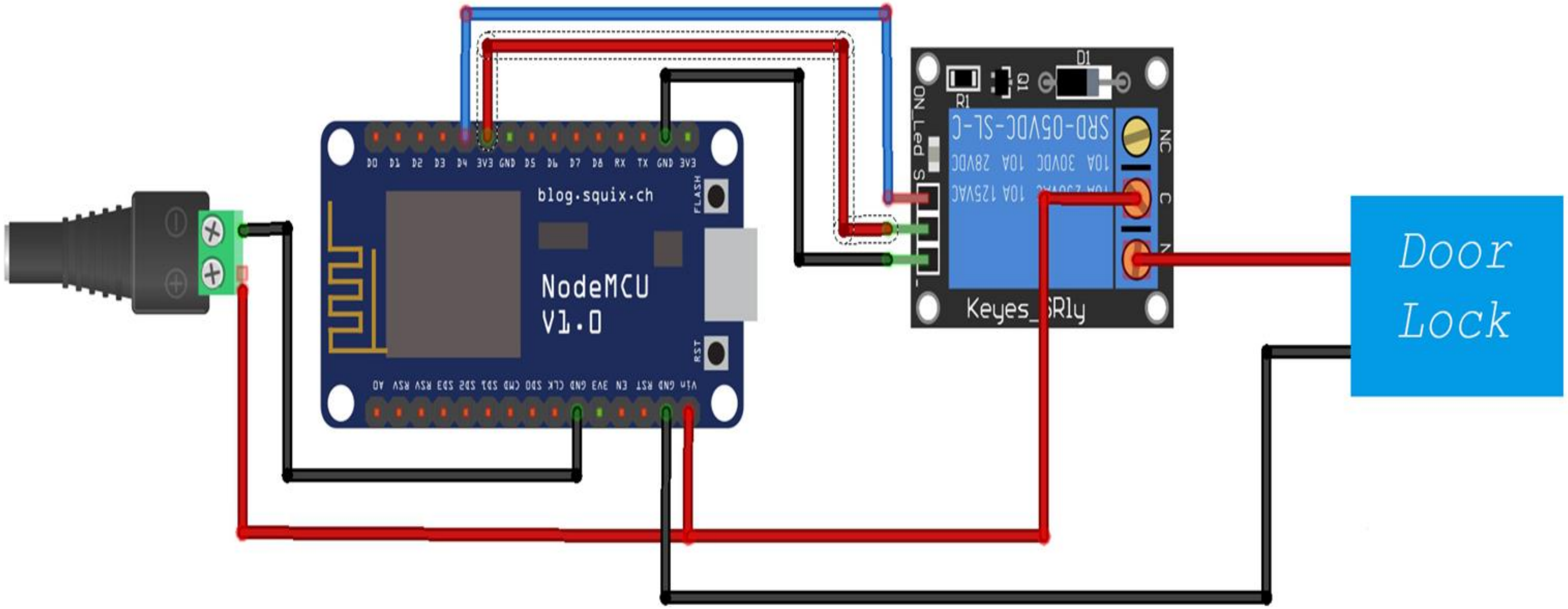
0003189657 048,43929
0003193329 048,47601

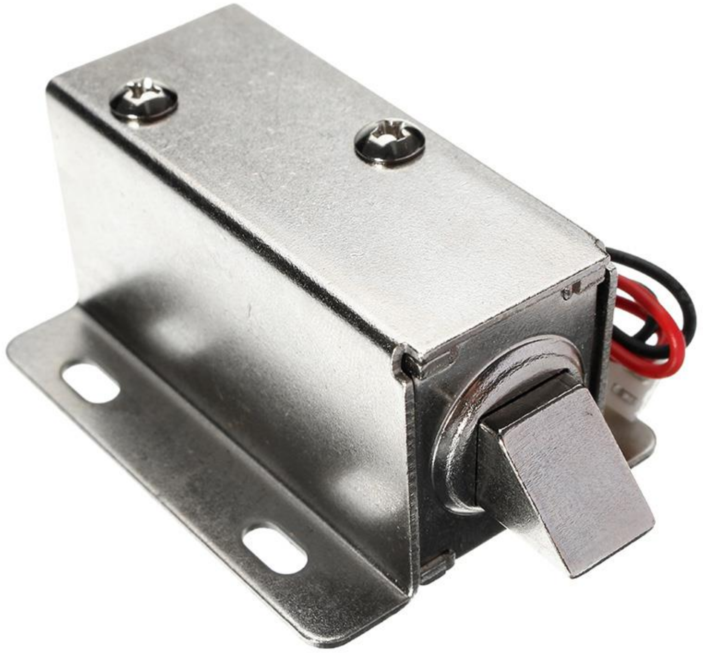
# LCD Module


i2C 16x2 LCD Screen
GND
VCC
SDA
SCL
A0
RSV
RSV
SD3
SD2
SD1
CMD
SD0
CLK
GND
3V3
EN
RST
GND
Vin
RST
FLASH
D0
D1
D2
D3
D4
3V3
GND
D5
D6
D7
D8
RX
TX
GND
3V3
SCL
SDA
VCC
GND

This is a 2x16
line LCD Display

# Solenoid Door Lock

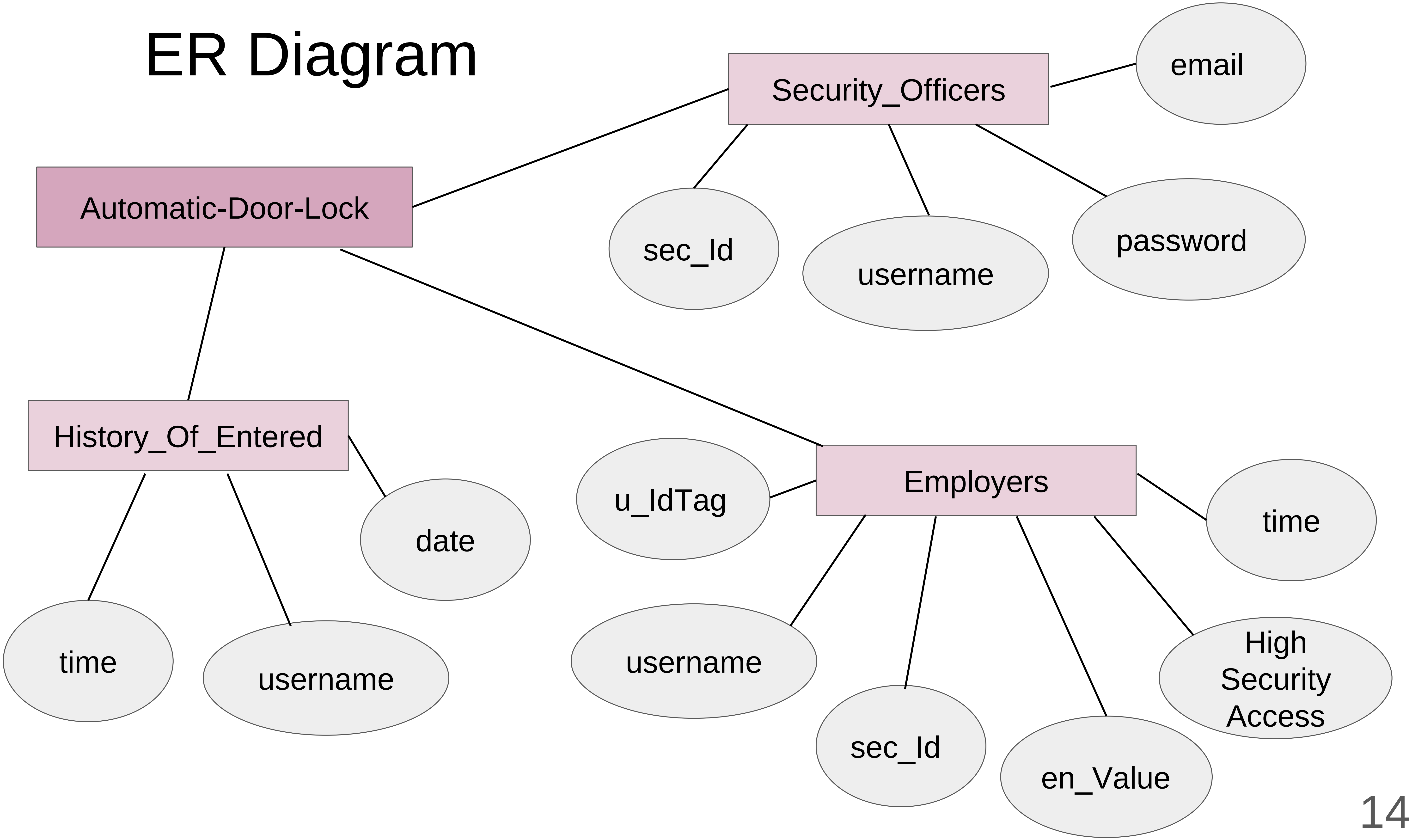




# Failure Handling

- In case of network failure
  - 4MB storage provided by nodemcu
- In case of power failure
  - generator will be used to supply power

# ER Diagram

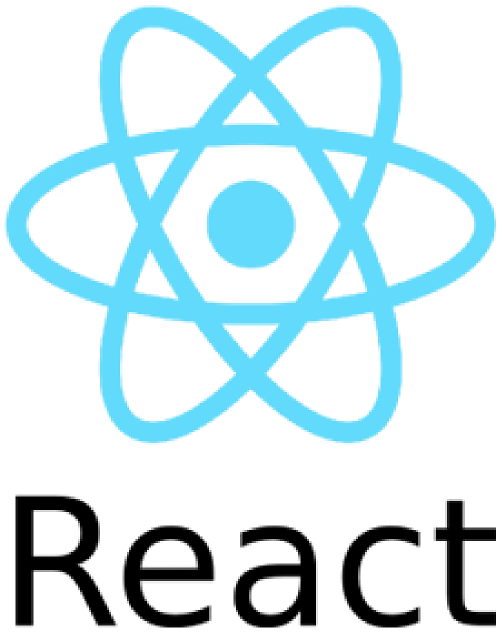

Security_Officers
email
sec_Id
username
password
Automatic-Door-Lock
History_Of_Entered
date
time
username
u_IdTag
Employers
time
username
sec_Id
en_Value
High Security Access

# TECHNOLOGIES

# Front-End Technology

- **ReactJS**

  - Use JavaScript
    - Fast and Responsive
  - Virtual DOM
    - Enables the creation of fast, scalable web apps
  - Component Creation
  - Improve Code Stability With Tests
  - Quickly Debug Faults

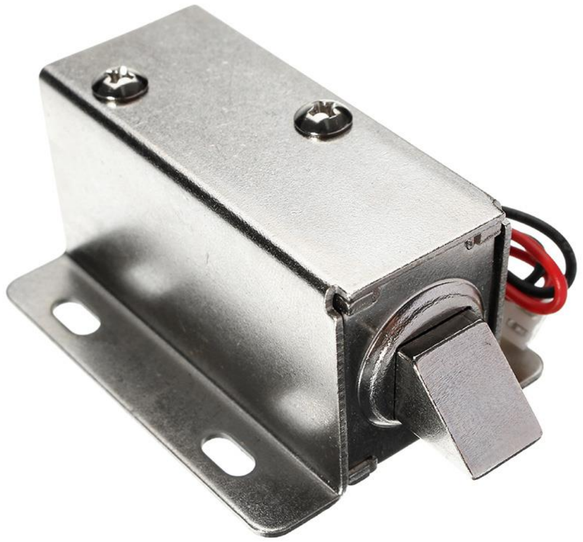


# Back-End Technology

- **Firebase**
  - Realtime Database
    - NoSQL database
    - JSON structure
  - Authentication
    - provides instant UI Libraries and SDKs
    - can integrate various sign-in techniques to allow user login
  - Hosting
    - Fast, secure, static, and production-grade hosting

- Sensors and Actuators

  - Fingerprint Sensor
  - PIR Sensors
  - RFID Reader
  - Solenoid Door Lock
  - Raspberry-pi cam Module
  - LCD Module



**ESP8266 Module**

- 3.3V power supply

**Raspberry-pi Board**

- 5V/2.5A DC input power

**Solenoid Door Lock**

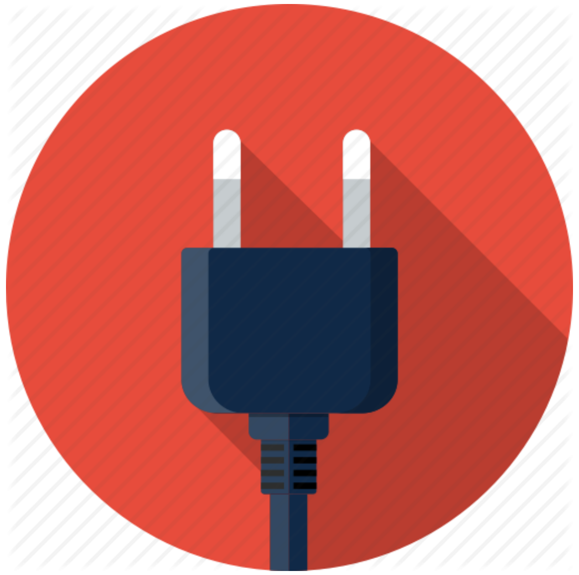
- Operating voltage : 12VDC
- Draws 650 mA at 12V, 500 mA at 9V when activated

**PIR Sensors**

- Operating voltage range : DC 4.5-20V
- Output voltage : HIGH-3.3V/LOW 0V

**Fingerprint Sensors(R307)**

- Supply voltage: DC 4.2 ~ 6.0V
- Storage capacity : 1000 pieces



# Design changes from proposal evaluation

- Raspberry-pi board instead of a NodeMCU for face recognition
  - Data processing is quick

- Raspberry pi cam module instead of a Webcam
  - High resolution
  - High sensitivity

- NodeMCU instead of Arduino board
  - NodeMCU has LAN facility with wireless connection

- Power adapter instead of Rechargeable Battery
  - Rechargeable batteries often become weak with the time

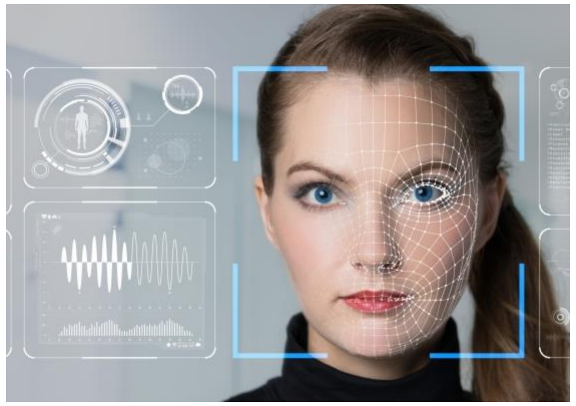
# PROJECT DEMONSTRATION

- Use 2 nodes → RFID reader + PIR Sensors

  ↓

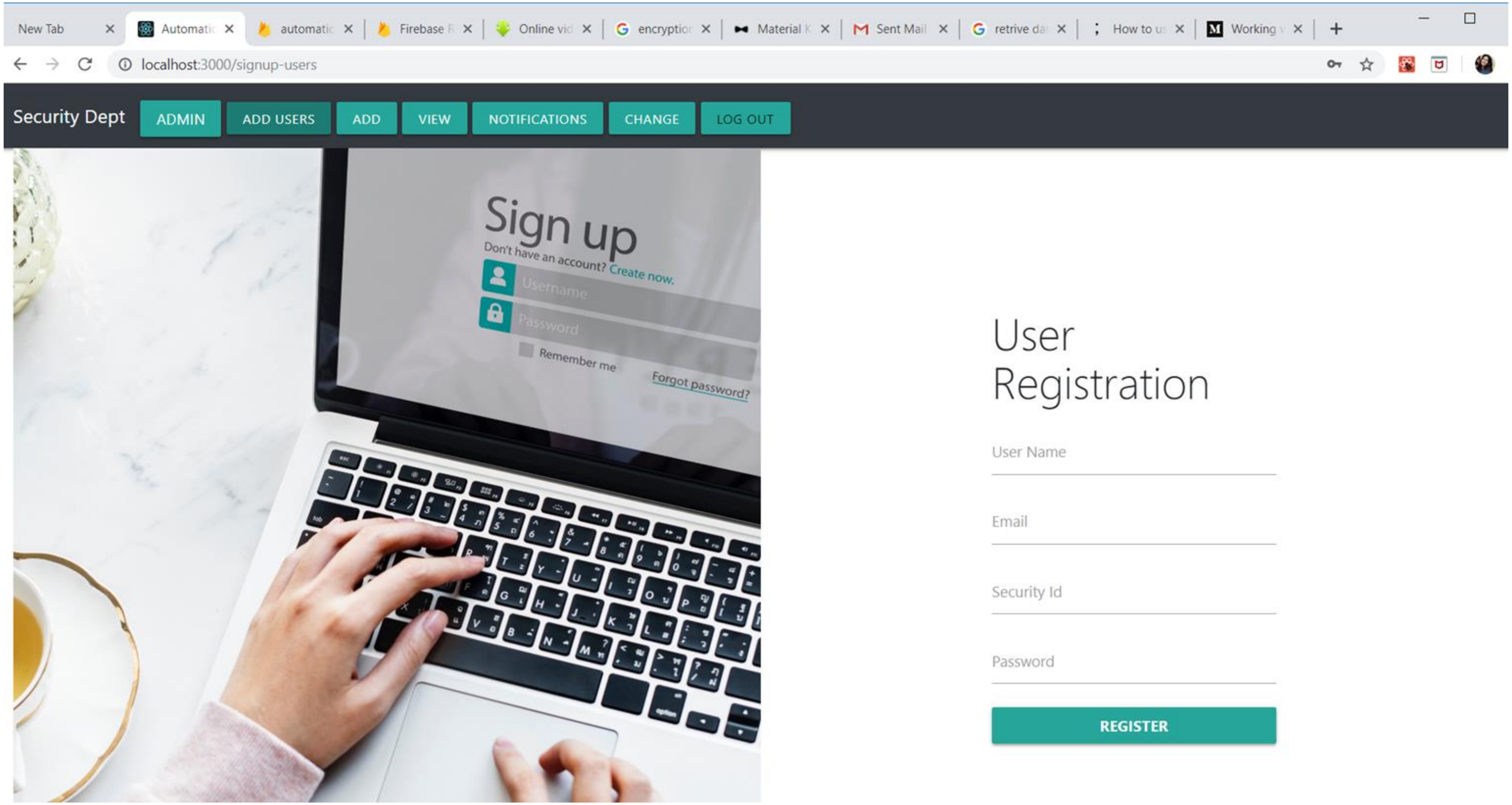
  Fingerprint sensor + Face recognition

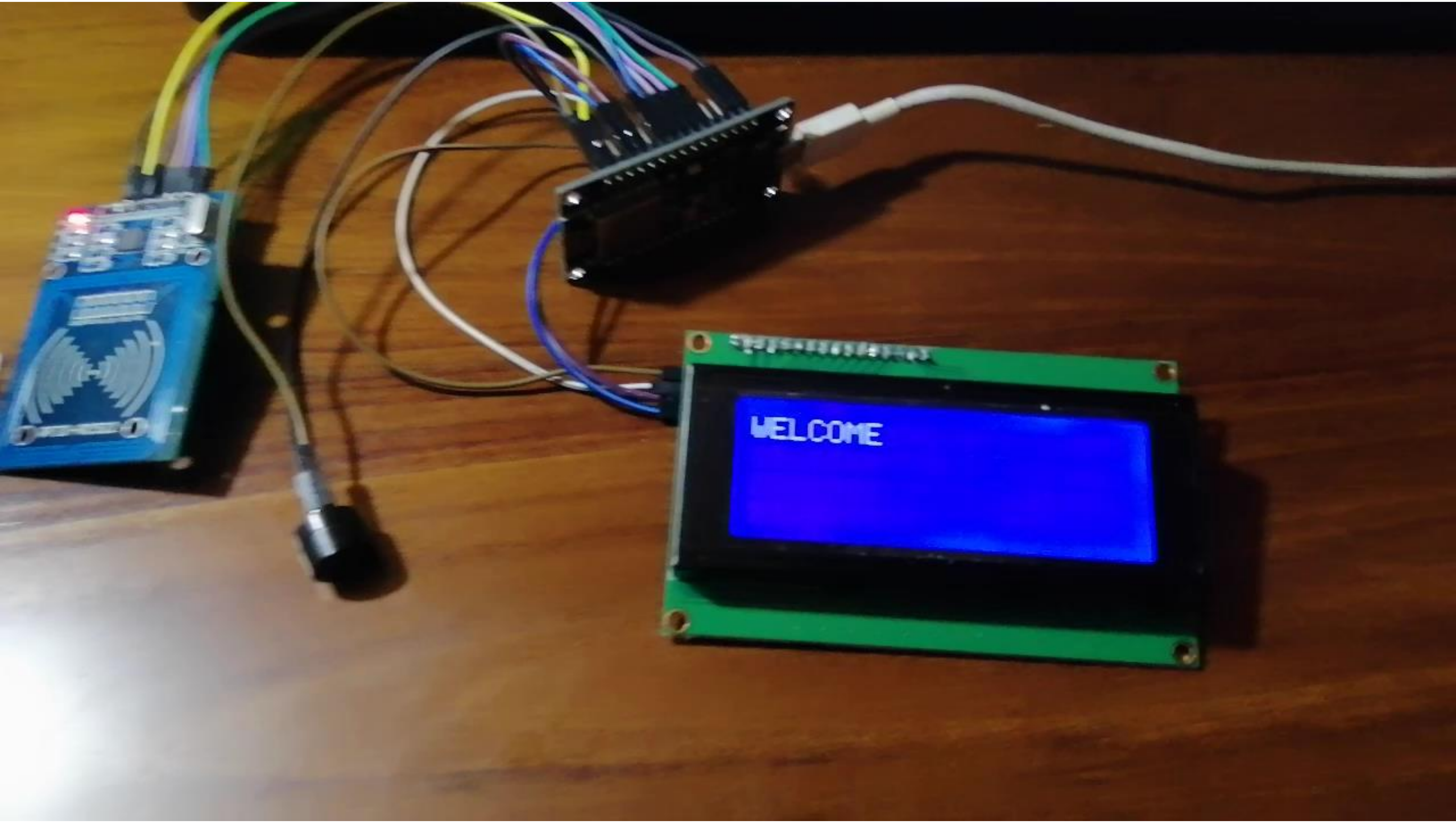
- Prototype Structure
  - Two doors



- Web Application

# GUI Design

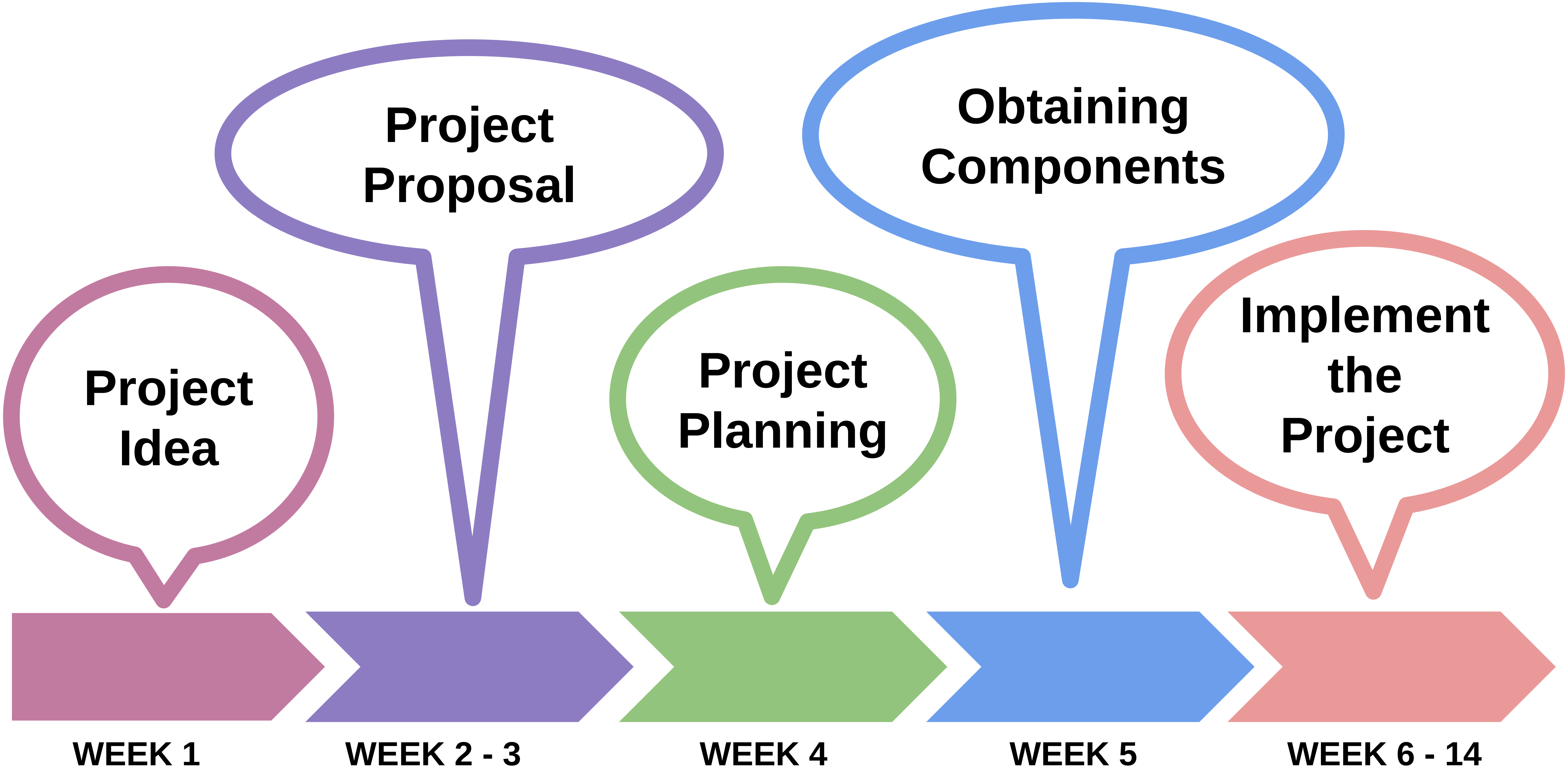

localhost:3000/signup-users
Security Dept
ADMIN
ADD USERS
ADD
VIEW
NOTIFICATIONS
CHANGE
LOG OUT
Sign up
Don't have an account? Create now.
Username
Password
Remember me
Forgot password?
User Registration
User Name
Email
Security Id
Password
REGISTER


WELCOME

# BUDGET

| Required Items | Number of Items | Price(LKR) |
|---|---|---|
| Solenoid door lock | 2 | 1900 |
| Buzzer | 2 | 100 |
| NodeMCU | 1 | 1000 |
| Fingerprint sensor | 1 | 2800 |
| RFID module | 1 | 560 |
| Power adapter | 1 | 400 |
| PIR sensors | 2 | 420 |
| LCD display | 2 | 600 |
| Relay module | 1 | 180 |
| **Total Cost** | | **7960** |

# TIMELINE



Project Idea

WEEK 1

Project Proposal

WEEK 2 - 3

Project Planning

WEEK 4

Obtaining Components

WEEK 5

Implement the Project

WEEK 6 - 14

# PROJECT COMBINATION

**1. Embedded**

- RFID
- Fingerprint Sensor
- PIR sensor
- Face Recognition

**2. Network**

- Data from sensors and controllers are sent to a centralized server using wifi module

**3. Security**

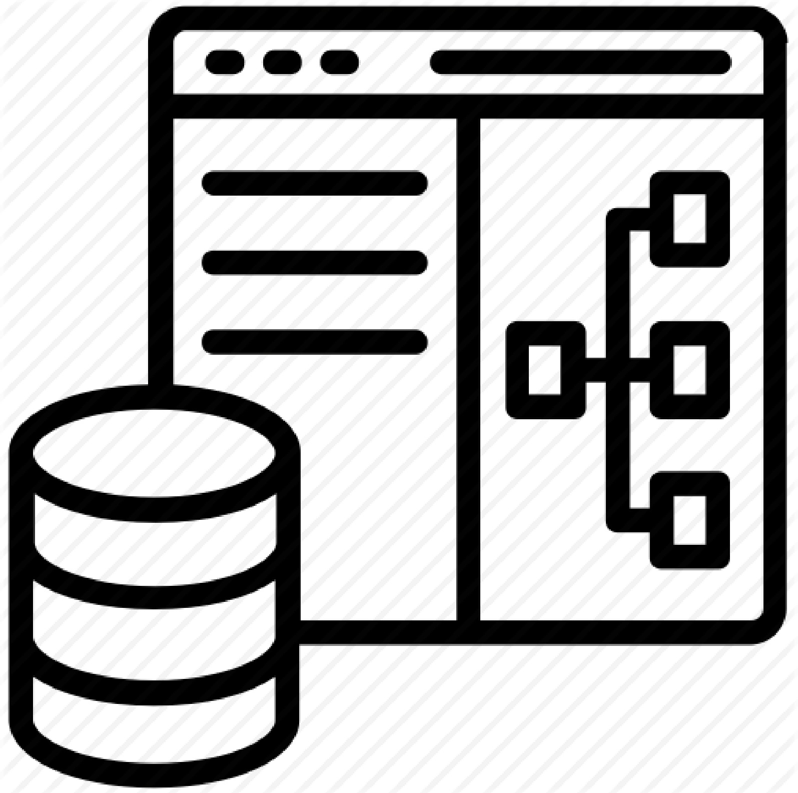
- Firebase authentication - data is encrypted in transit
- HTTPS protocols used by firebase

## 4. Web Application

- When?
- Who?
- Where?
- Alert unauthorized access

## 5. Data structures

- Considered in storing data in a database



# THANK YOU!