SMART ACCESS CONTROL and MONITORING SYSTEM

using RFID and IoT Technology

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POINTS OF DISCUSSION

- About The Project
- Functions and Features
- Resources
- Circuit Diagrams
- System Architecture
- App and Database Previews
- Flowchart
- Mobile App Demo
- Project Cost Breakdown
- Gantt Chart

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ABOUT THE PROJECT

This project incorporates an RFID sensor and key to authenticate authorized persons within an establishment. When an authorized UID is scanned by the RFID, a green light will turn on. If the sensor detects an unauthorized attempt, a red light will turn on, and the alarm system will engage. The room's LEDs can be turned off and on via the dashboard. Additionally, the project includes a dedicated mobile app that is only accessible by the administrator, featuring comprehensive control over lights and sensors, a dashboard displaying all data of entries, and a constant temperature and humidity display.

FUNCTIONS & FEATURES

- RFID logging of users (authorized and unauthorized)
- Dedicated Mobile Application
  - Displaying status for lights, alarm, temperature and humidity
  - In-app controls of enabling/disabling alarms and lights
  - Creating, updating, user account details and restrictions
  - Data entry logs

MATERIALS & APPLICATIONS

- Arduino
- Wemos D1
- RFID module and key
- DHT sensor
- Relay switch
- Buzzer
- LED

- Visual Studio 2022 (C#)
- PHP
- MySQL
- XAMPP
- Arduino IDE
- Xamarin Android Studio

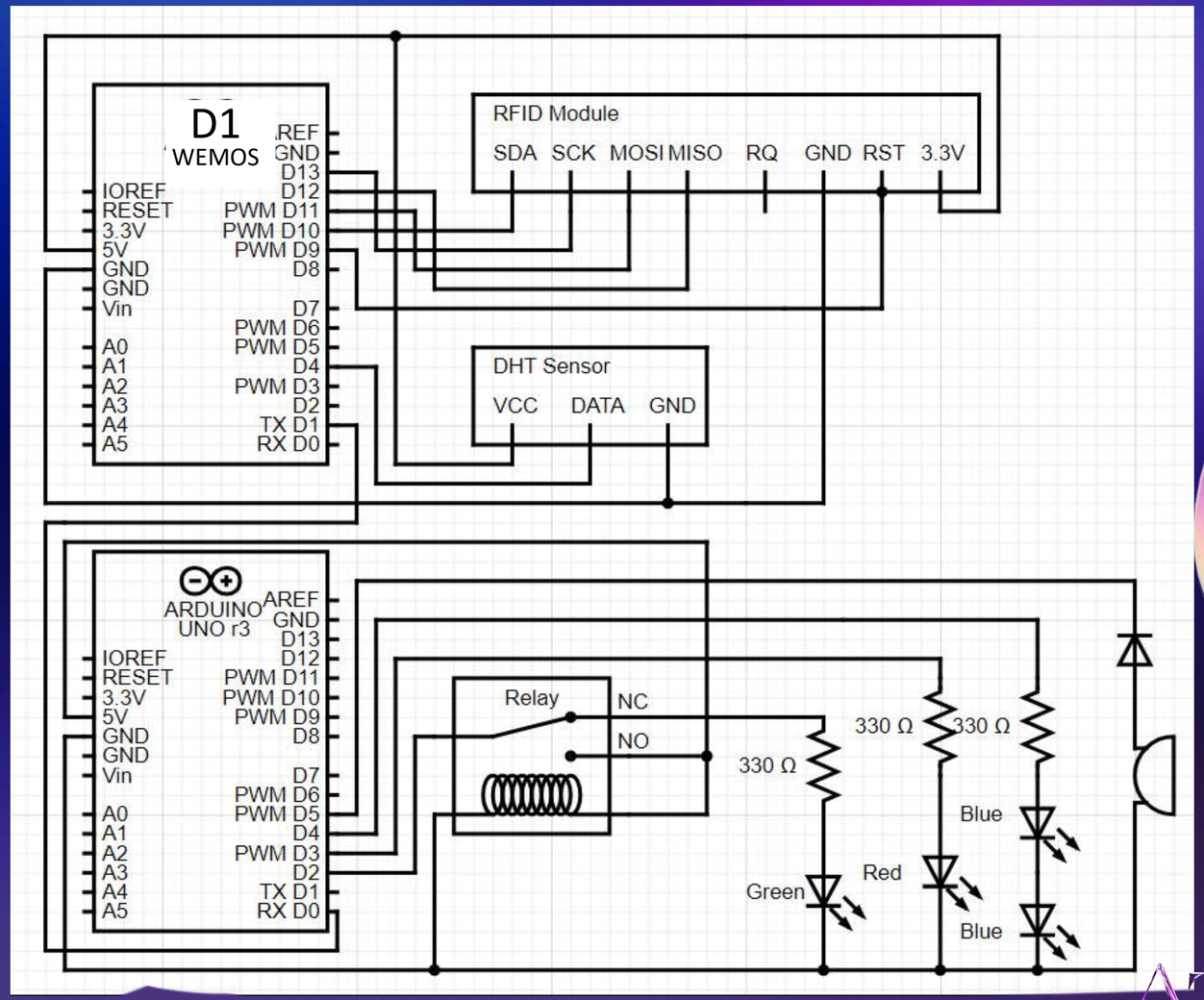
CIRCUIT DIAGRAM

Wemos

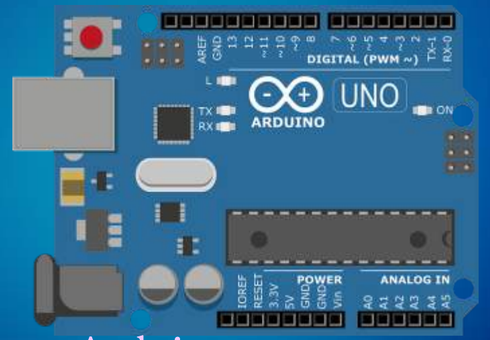
- D1 - Tx to Arduino Rx
- D4 - DHT sensor
- D9 - RFID rst
- D10 - RFID sda
- D11 - RFID mosi
- D12 - RFID miso
- D13 - RFID sck

Arduino

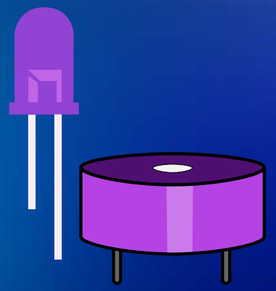
- PIN 0 - Rx from Wemos Tx
- PIN 2 - Green LED
- PIN 3 - Red LED
- PIN 4 - Blue LED
- PIN 5 - Buzzer



SYSTEM ARCHITECTURE



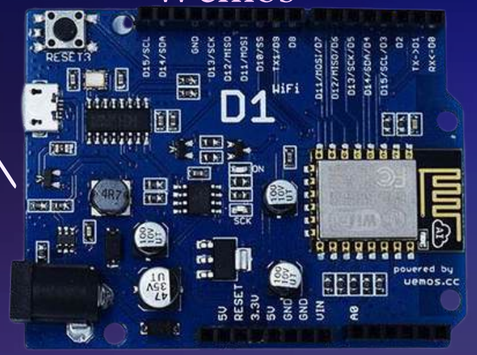
Arduino



API

RESTful

Mobile Application



Wemos

Server Database

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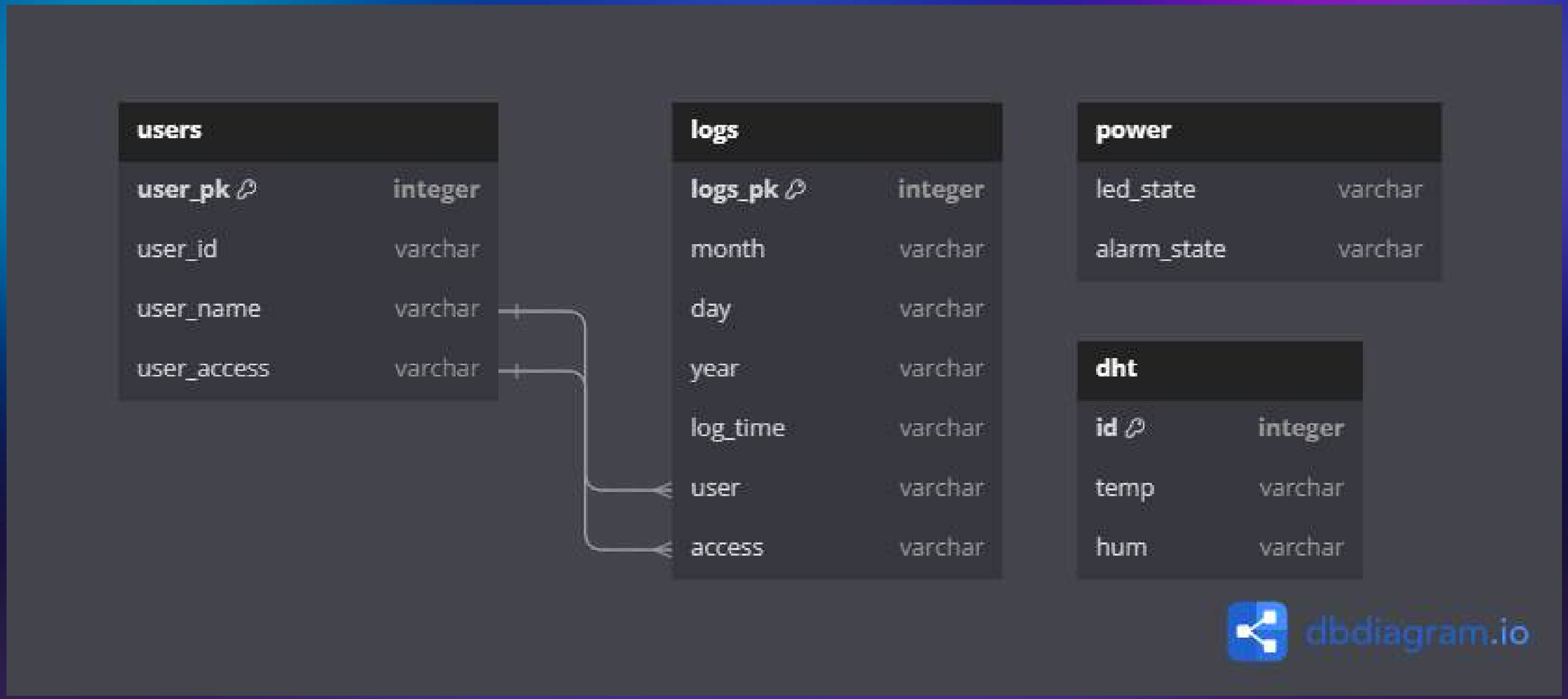
DATABASE PREVIEW



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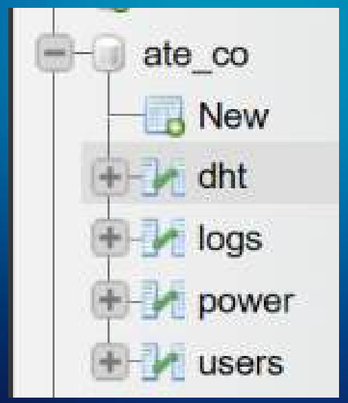

ate_co database

id	temp	hum
984	32.80	95.00
985	32.80	95.00
986	32.80	95.00
987	32.80	95.00
988	32.80	95.00
989	32.80	95.00
990	32.80	95.00

dht table

logs_pk	month	day	year	log_time	user	access
1	07	20	2024	15:50:28	Ivan	1
2	07	20	2024	15:51:30	Ivan	1
3	07	20	2024	15:52:08	Ivan	1
4	07	20	2024	15:52:10	Ivan	1
5	07	20	2024	15:56:38	Ivan	1
6	07	20	2024	15:57:15	Ivan	1
7	07	20	2024	15:58:40	Ivan	1

logs table

led_state	alarm_state
1	1

power table

user_pk	user_id	user_name	user_access
1	B6 DF F3 8B	Ivan	1
2	19 48 A1 28	Reiner	0
3	5C B5 30 16	Xavier	1

users table

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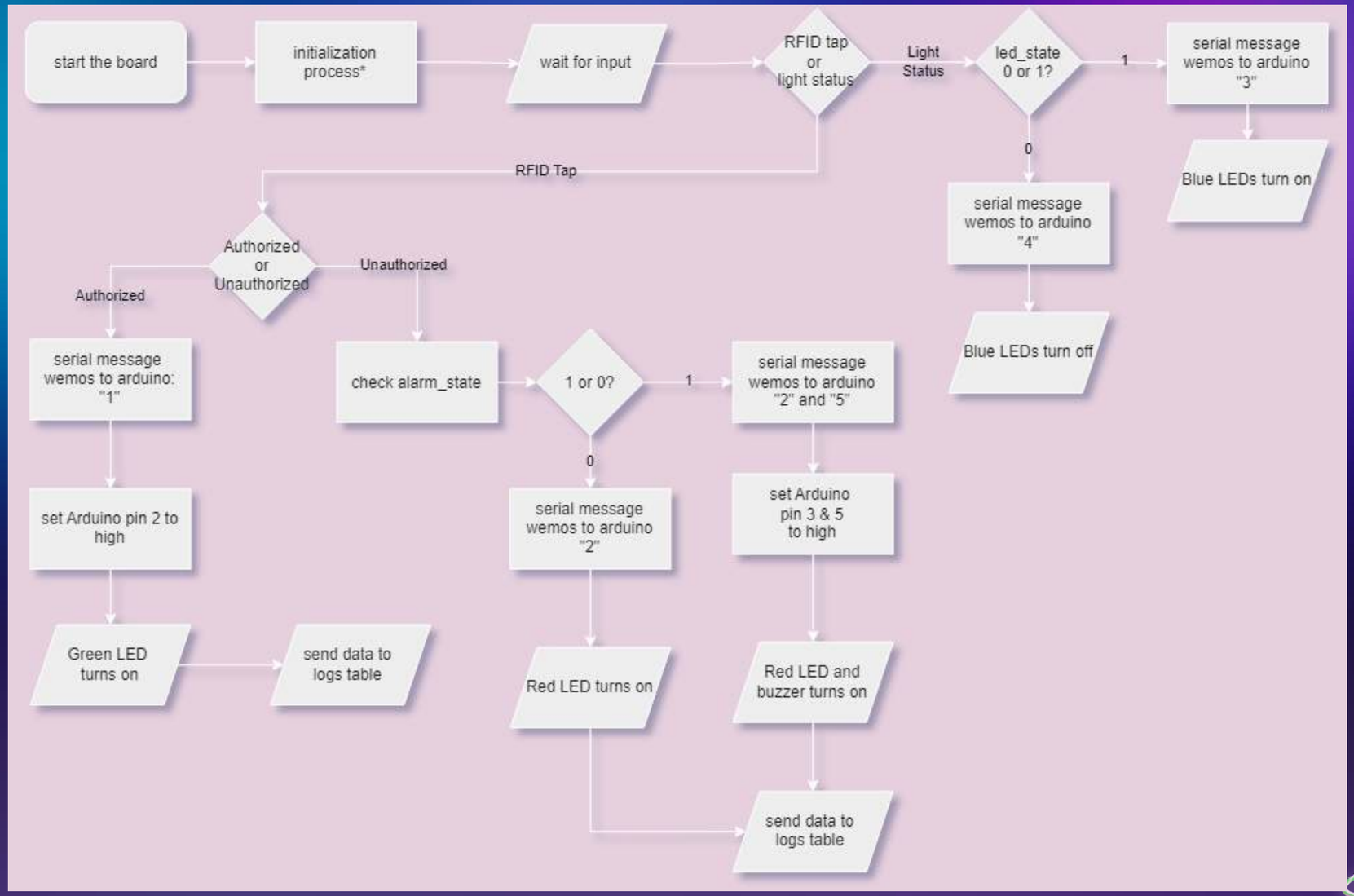
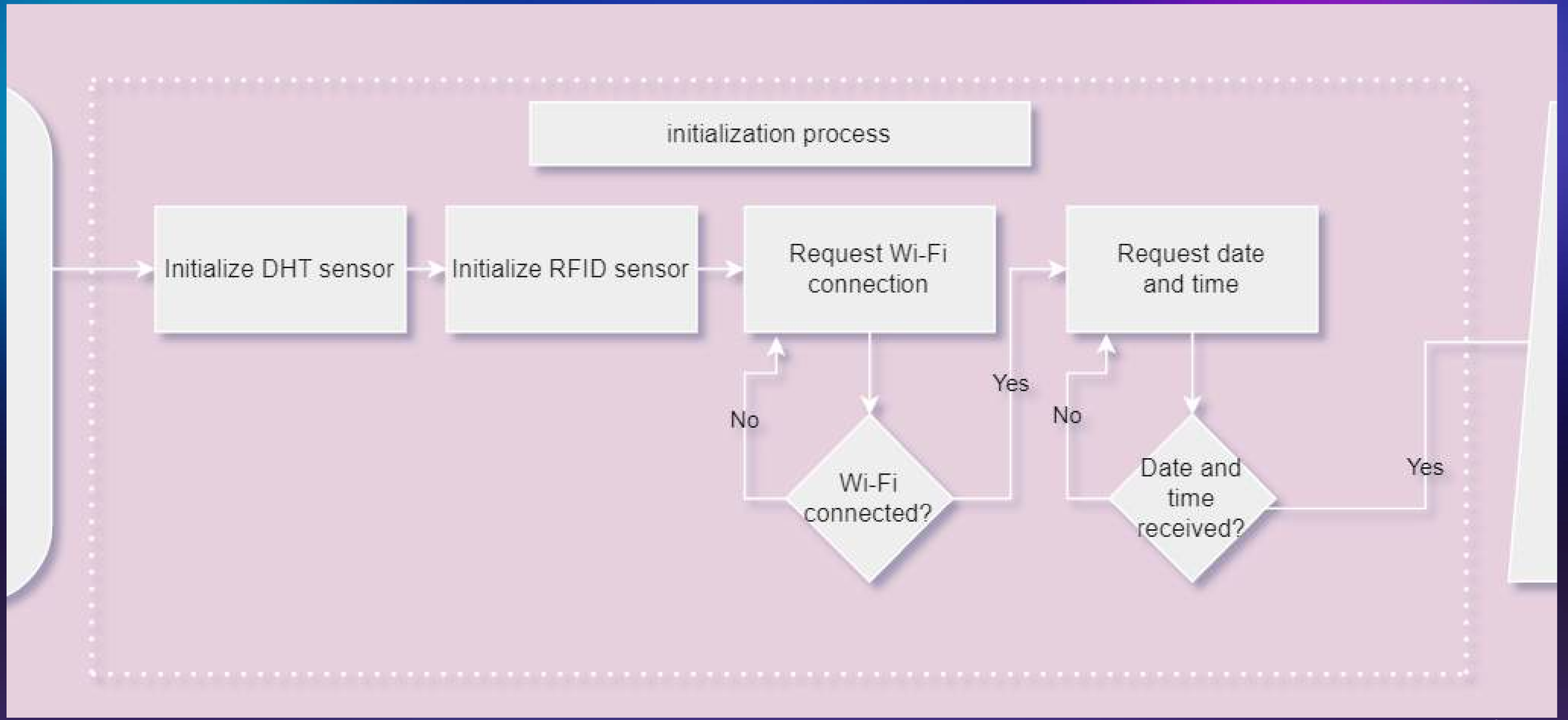
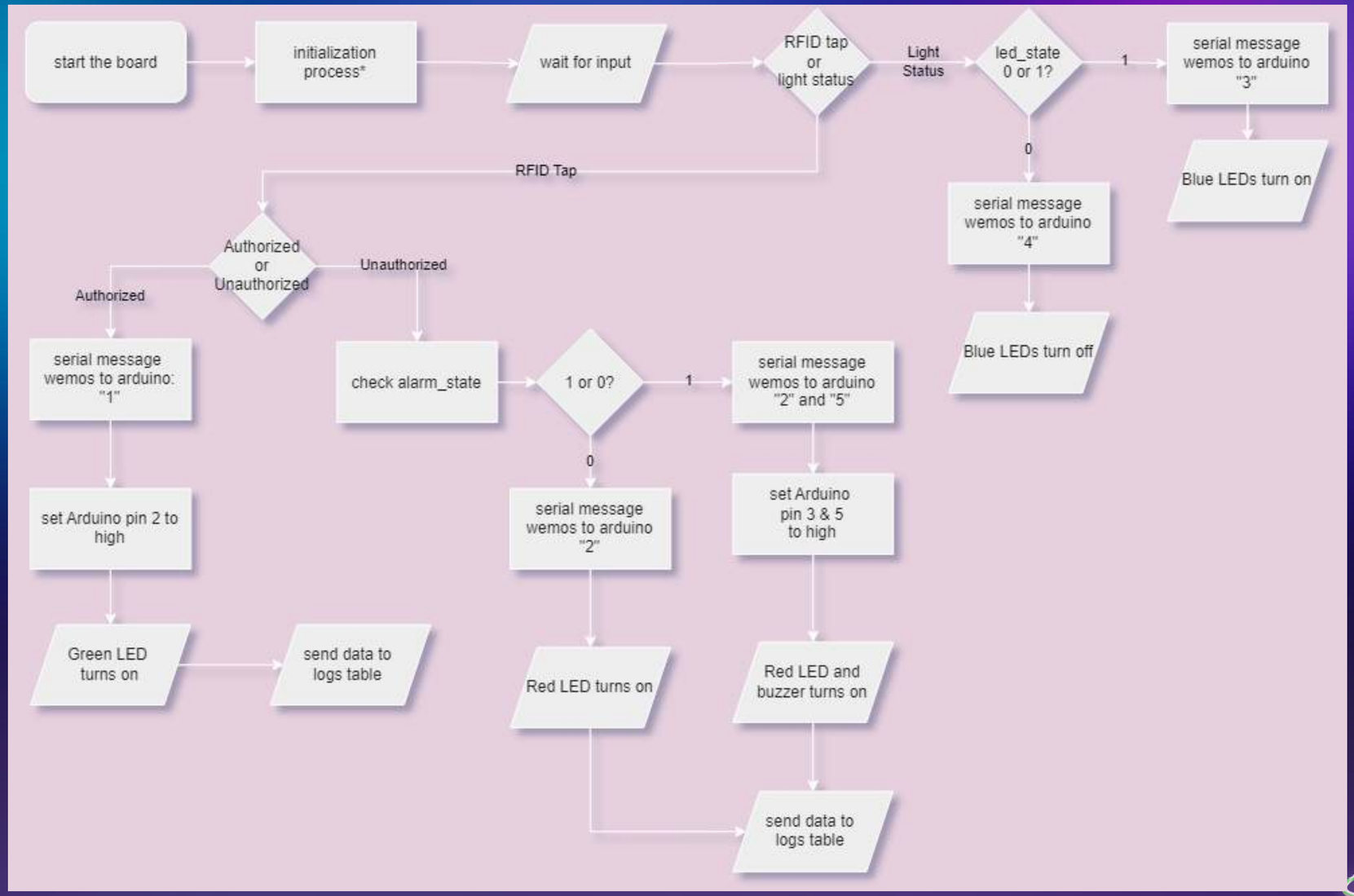
FLOWCHART


start the board
initialization process*
wait for input
RFID tap or light status
Light Status
led_state 0 or 1?
1
serial message wemos to arduino "3"
Blue LEDs turn on
0
serial message wemos to arduino "4"
Blue LEDs turn off
RFID Tap
Authorized or Unauthorized
Authorized
Unauthorized
serial message wemos to arduino: "1"
set Arduino pin 2 to high
Green LED turns on
send data to logs table
check alarm_state
1 or 0?
1
serial message wemos to arduino "2" and "5"
set Arduino pin 3 & 5 to high
Red LED and buzzer turns on
0
serial message wemos to arduino "2"
Red LED turns on
send data to logs table

FLOWCHART


initialization process
Initialize DHT sensor
Initialize RFID sensor
Request Wi-Fi connection
Request date and time
No
Wi-Fi connected?
Yes
No
Date and time received?
Yes

FLOWCHART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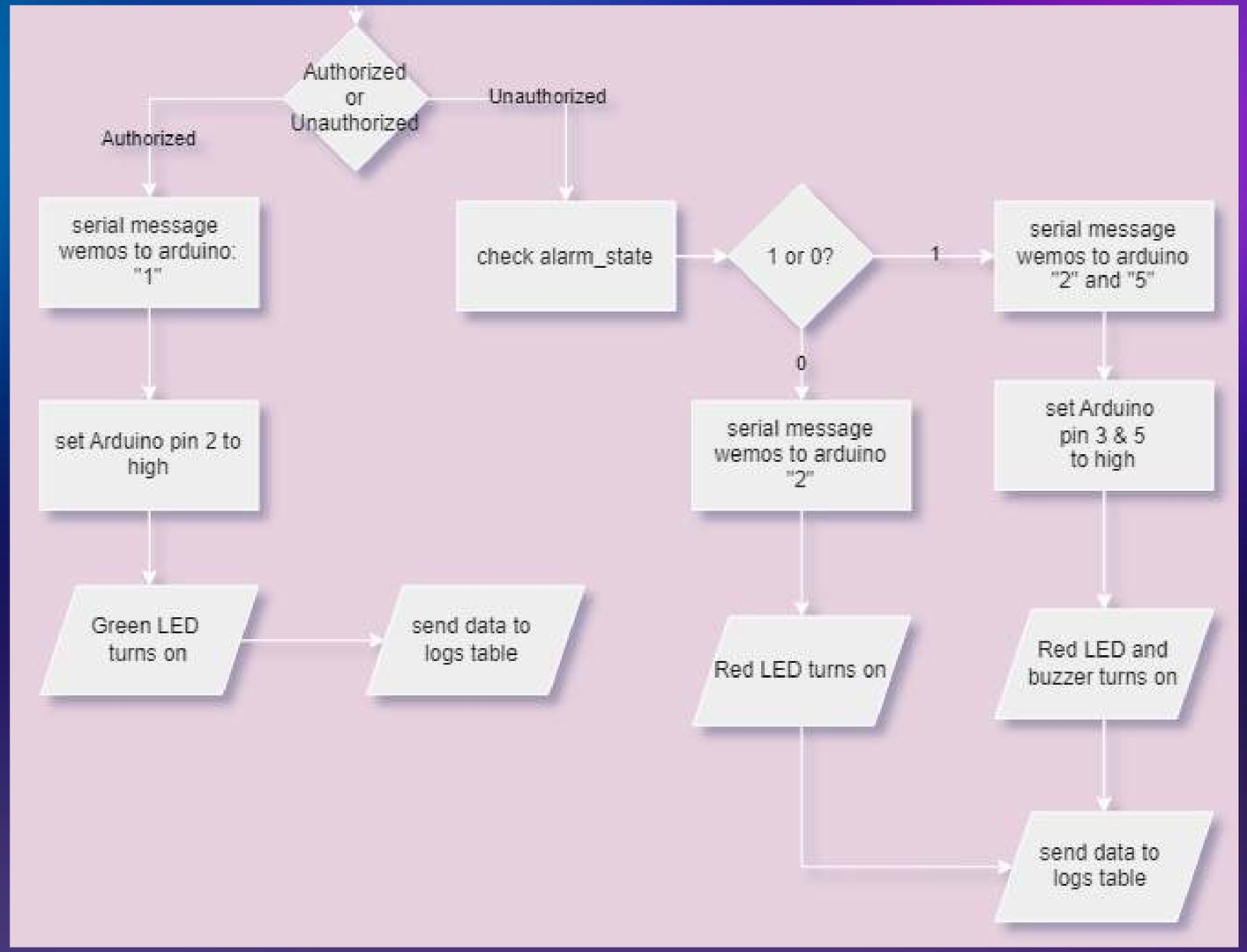
FLOWCHART

- 1 - Authorized UID Detected
- 2 - Unauthorized UID Detected
- 3 - led_state is set to 1
- 4 - led_state is set to 0
- 5 - alarm_state is set to 1



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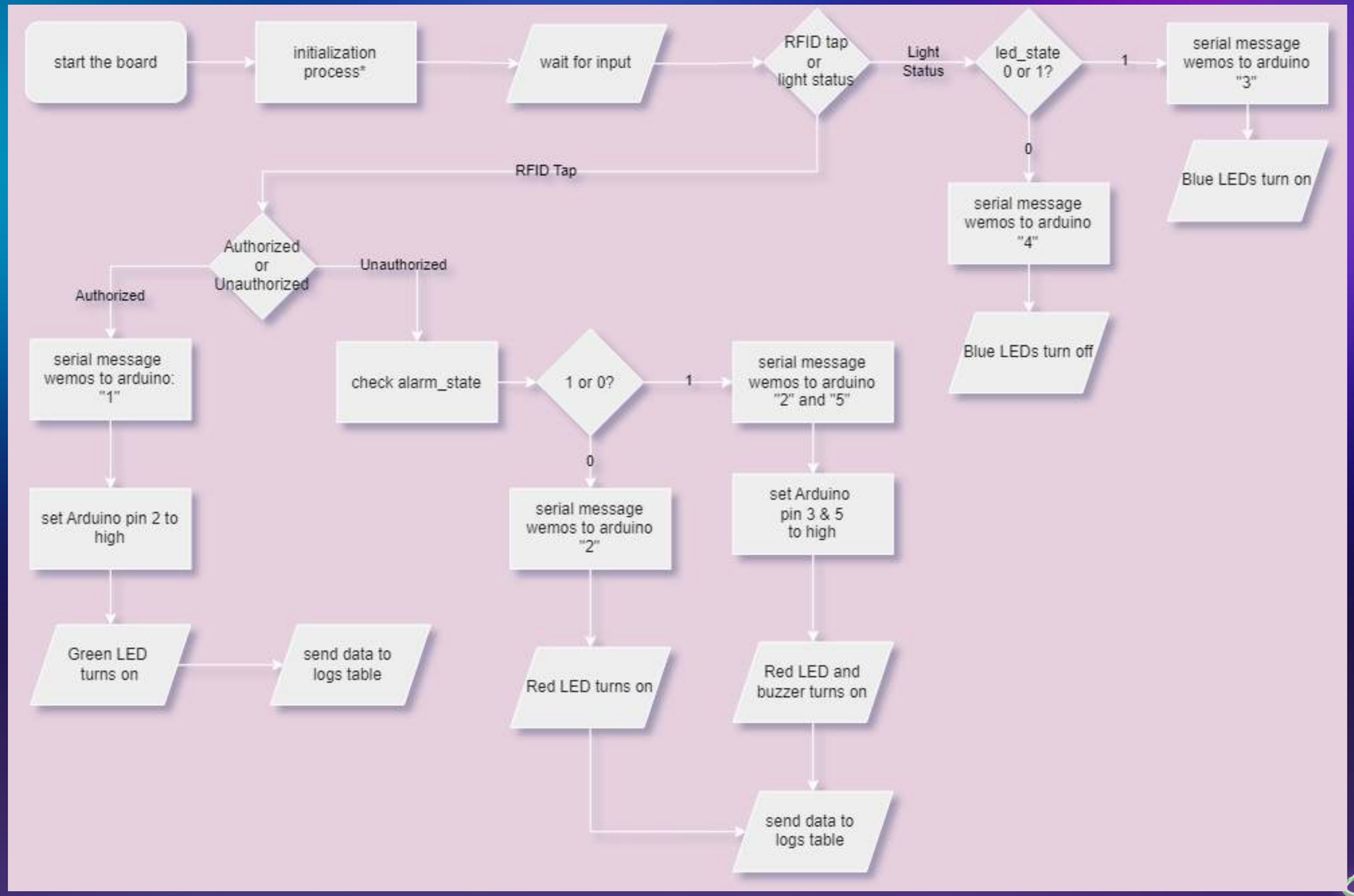
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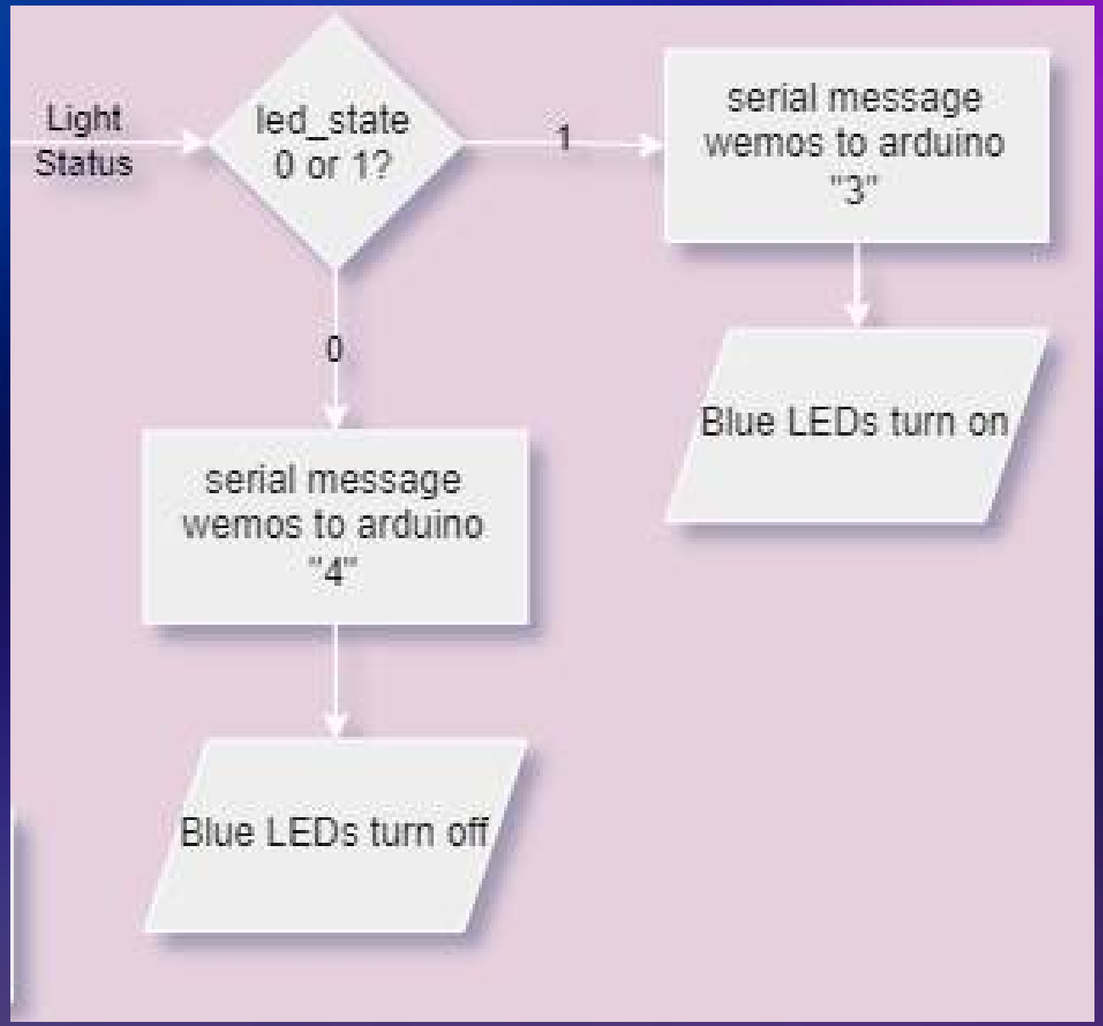
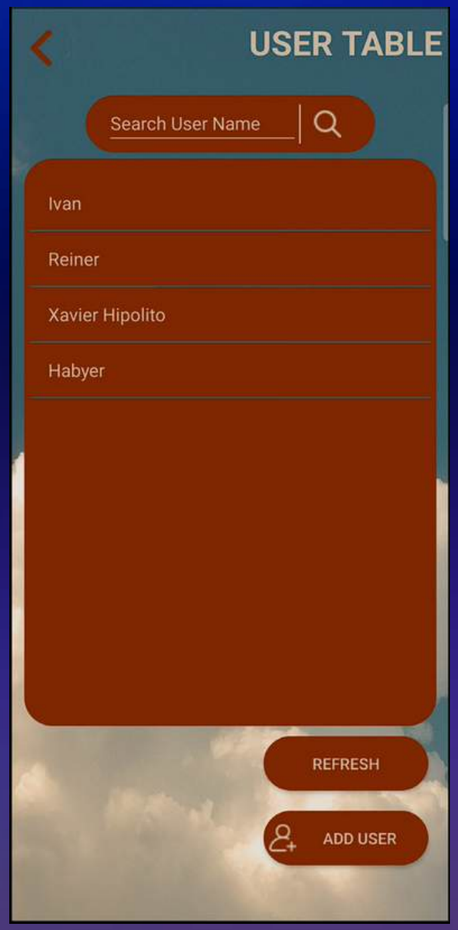


MOBILE APPLICATION DEMONSTRATION



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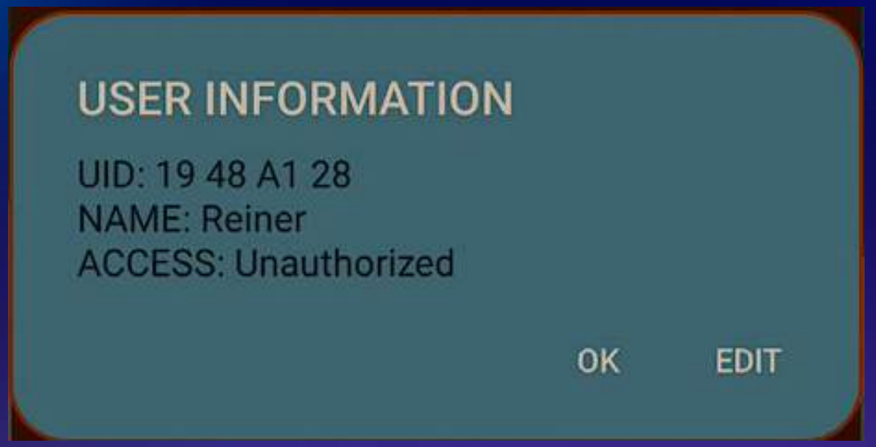

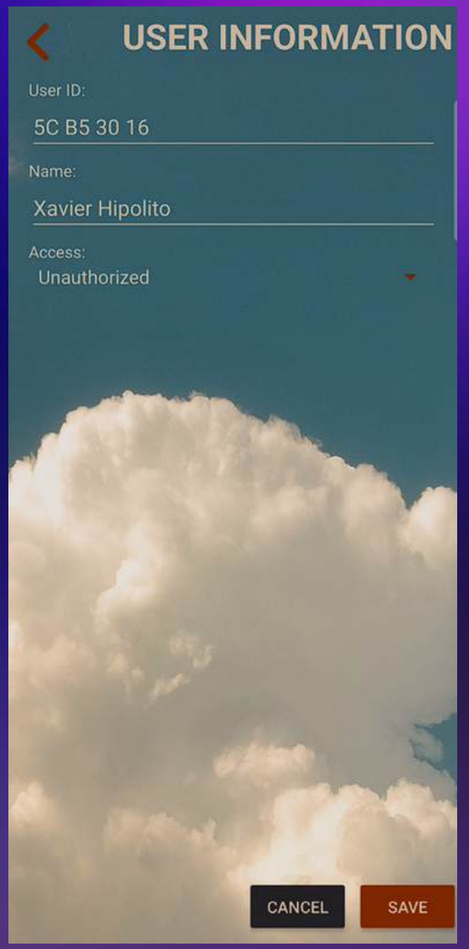

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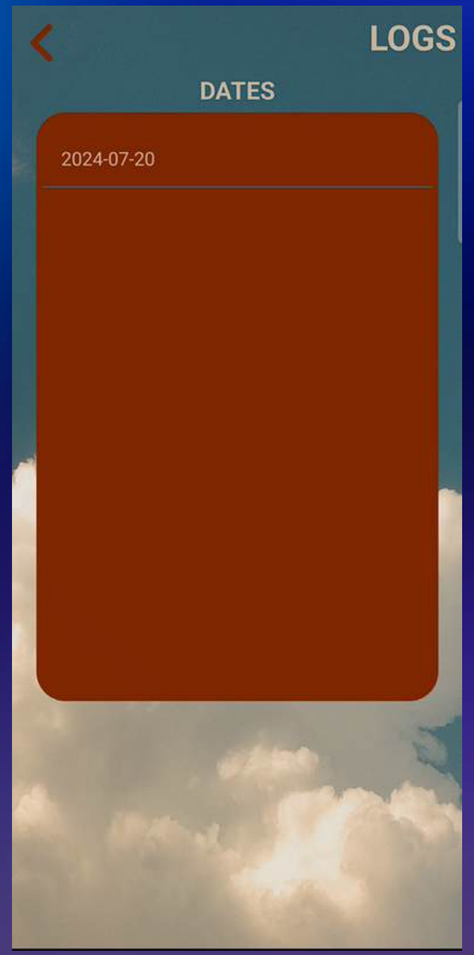

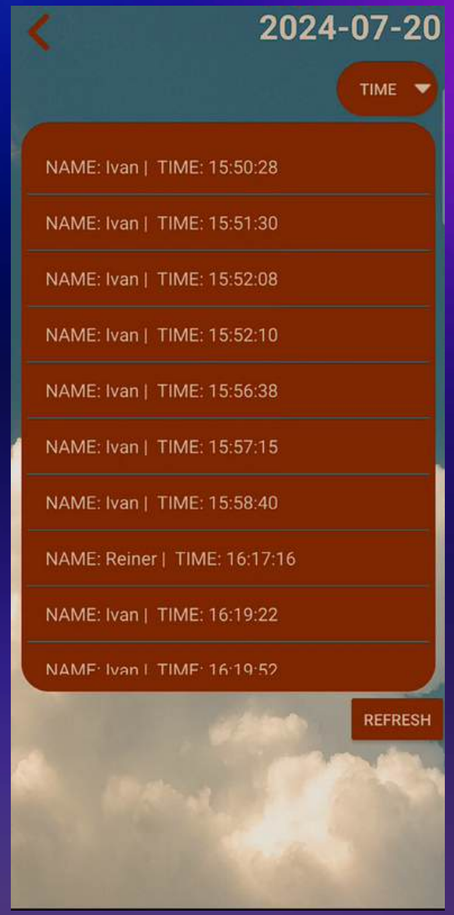

PROJECT COST BREAKDOWN

Item	Quantity	Cost
Wemos D1	1	PHP 150
Arduino Uno	1	PHP 159
RFID Module	1	PHP 129
DHT Sensor	1	PHP 125
Relay Switch	1	PHP 79
LEDs	10	PHP 25
Buzzer	1	PHP 50
Jumper Wires	30	PHP 70
Breadboard	1	PHP 25
Jumper Wires	1	PHP 29

Total Cost = PHP 841

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GANTT CHART

Smart Access Control and Monitoring System using RFID and IoT Technology			
Task Name:	*Days to Complete:*	*Start:*	*Finish:*
DEVELOPMENT	11 days		
Review of Initial Project	1	7/10/2024	7/10/2024
Integrating the RFID sensor	1	7/10/2024	7/10/2024
Identifying pins Wemos and Arduino	7	7/10/2024	7/16/2024
Creating the Mobile Application	7	7/10/2024	7/16/2024
Creating functions	7	7/13/2024	7/19/2024
OOP Integration	7	7/13/2024	7/19/2024
Connecting the application to the database	7	7/13/2024	7/19/2024
Finalizing circuit and mobile app	1	7/20/2024	7/20/2024
DOCUMENTATION	2 days		
Creating the Gantt Chart	1	7/19/2024	7/19/2024
Compiling info for Powerpoint	1	7/19/2024	7/19/2024
Finalized flowchart	1	7/19/2024	7/19/2024
Creating the circuit diagram	1	7/20/2024	7/20/2024
Final revisions for PPT	1	7/20/2024	7/20/2024
Finishing documentation	1	7/20/2024	7/20/2024
FINALIZATION	1 day		
Presentation Day	1	7/22/2024	7/22/2024

TIMELINE

JULY												
10	11	12	13	14	15	16	17	18	19	20	21	22
1	2	3	4	5	6	7	8	9	10	11	12	13

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MEMBERS

Reiner
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Miran

Xavier
Hipolito

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THANK YOU
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