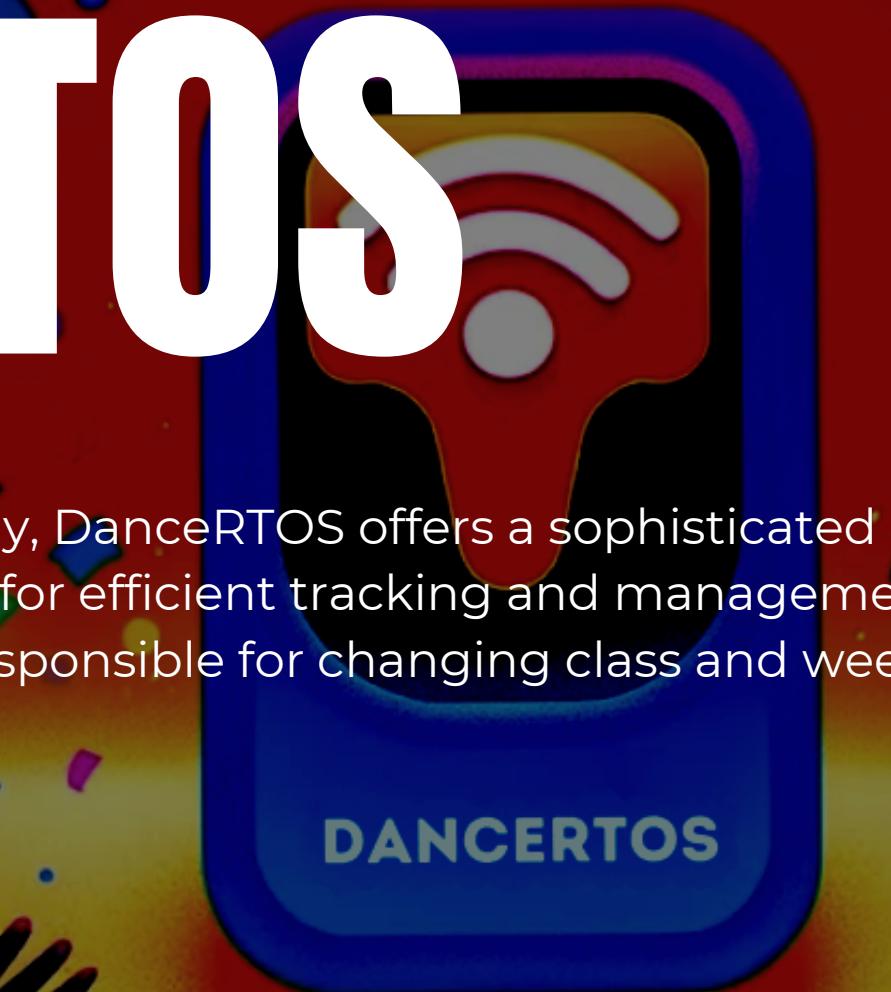


DanceRTOS

Leveraging FreeRTOS ESP32 and RFID technology, DanceRTOS offers a sophisticated attendance system integrated with a web server for efficient tracking and management, while also offering Blynk to be used by officers responsible for changing class and week the device is installed.

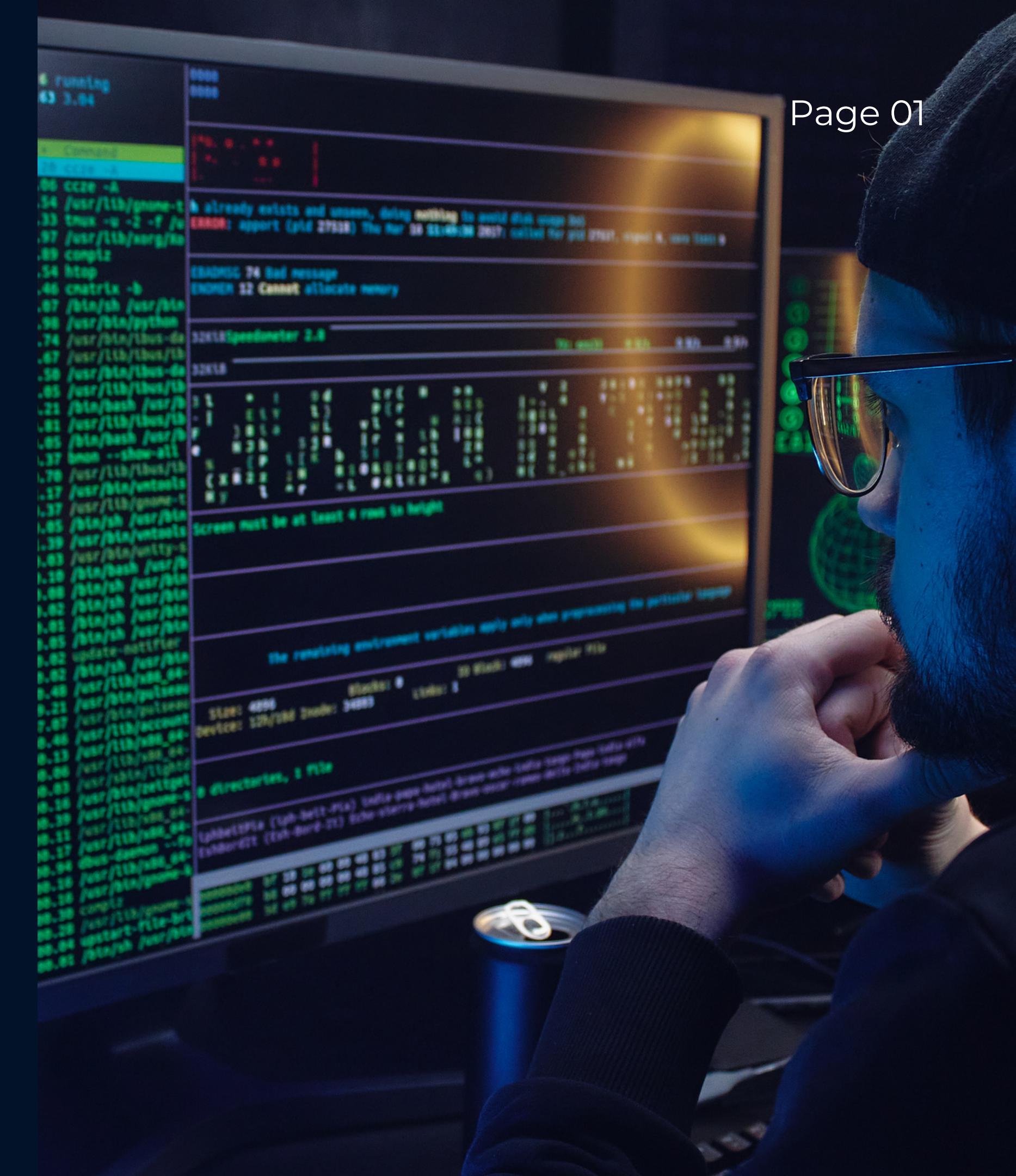
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<https://github.com/cattyman919/AbsenceSystem>



WELCOME TO DANCERTOS

In the midst of educational dynamics, attendance management is still a challenge that demands effective solutions. Manual attendance systems are prone to errors, less efficient in recording student or employee attendance, and this is further exacerbated by the existence of examples of proxy attendance, which causes inaccurate recording. As a result, these systems hinder transparency and real-time updates, hindering the ability of educators or managers to make informed judgments. This research initiative recognizes these limitations, aiming to address presence challenges that are prevalent in both academic and corporate fields. Reliance on manual methods results in inaccuracies, data management complexity, and time-consuming processes. Therefore, the development of an attendance system that integrates IoT and RFID technology seeks to overcome these problems, ensure efficiency, accuracy and simplify attendance management for students.

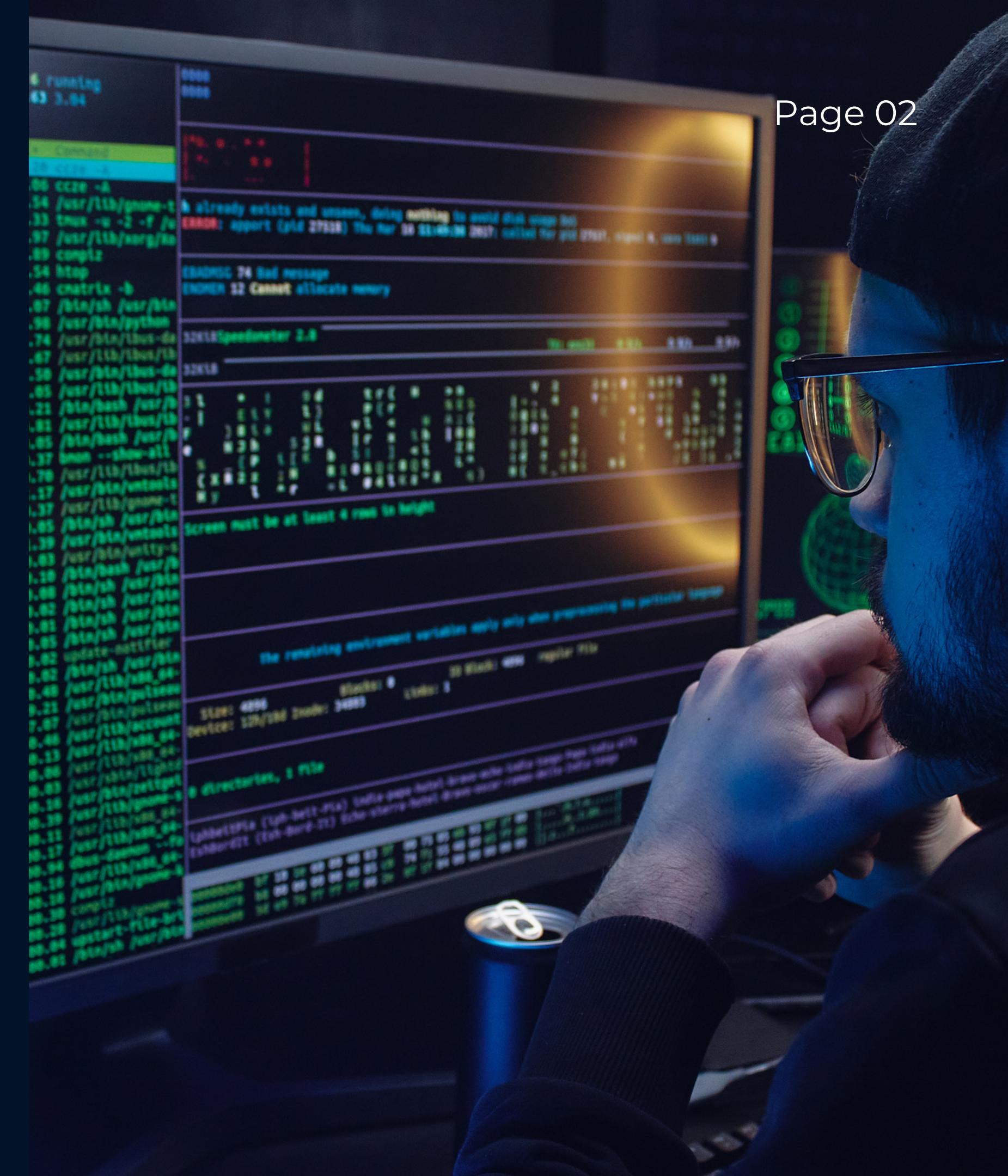
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WELCOME TO DANCERTOS

The proposed solution tackles challenges by leveraging an innovative technological approach, integrating IoT utilizing ESP32 as the central control unit and RFID technology. This solution aims to create an integrated attendance process that is accurate, efficient, and user-friendly. Key components like ESP32, RFID Reader, Cards for user identification, and the Web/Application Interface are systematically designed for seamless hardware-user interaction. Introducing user-friendly features such as the LCD screen for immediate confirmation and an accessible Web/Application Interface, this solution facilitates attendance management for educators or managers. Additionally, OTP implementation ensures accurate student attendance, curbing proxy attendance. The user registration process via RFID tags and database integration ensures comprehensive registration before attendance, promoting a more structured and precise attendance process. Overall, this solution anticipates addressing challenges and significantly benefiting stakeholders by improving efficiency, accuracy, and real-time attendance data.

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ATTENDANCE FORM

PROPOSED SOLUTION

The solution is based on an existing, profound, and prevalent solution which is to utilize RFC522 to scan RFID cards. However, we have the initiative to make something unique which is to add an OTP implementation using MQTT and a dedicated mobile app for the teachers and students to use. Think of it like a portal application for academics.

Our intention is to give teachers and administrators leeway in managing an attendance system and preventing old style paper-based attendance by making DanceRTOS modular. To change settings (i.e. changing class), it is as simple as picking from a dropdown menu in the Blynk application. For teachers, they can intervene attendance record if they catch students skipping classes.

As validators, we have extensive confirmation popups in the mobile application and also LCD to be utilized as an actuator.

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ACCEPTANCE CRITERIAS

01

Accurate

System must be able to register users by automatically identifying card's RFID and saves the correct name and NPM to the database.

03

Spoofless

To prevent students from skipping class, the system must be able to challenge students using OTP.

05

Maintenance

System should be able to provide maintenance by itself. For example, in case of network congestion, system should attempt to reconnect aggressively to prevent slowdown.

02

Validation

System should be able to process attendance by matching the data between RFID and database to a registered user and give confirmation on LCD.

04

Interfacing

Mobile and Blynk application must be responsive and detailed in showing the attendance log. Teachers are allowed to delete attendance.

06

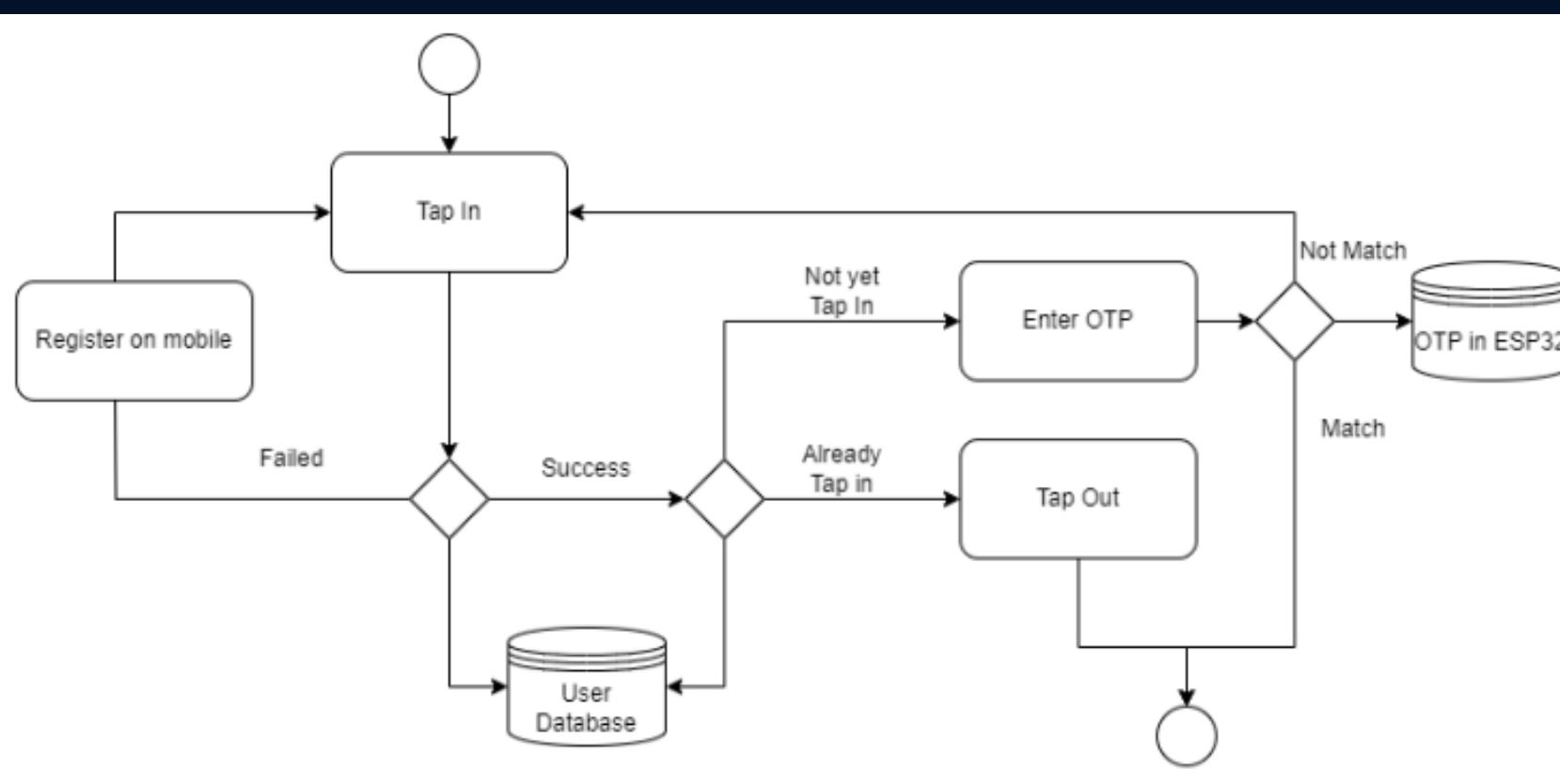
Security

System security must be guarded at high priority, including access control to the attendance and authentication features in the mobile application.

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FLOWCHART

Student



Register on mobile: This process is the starting point where students try to register themselves on the system via the mobile application. If registration fails, the process stops here. However, if successful, the process continues to the next step.

Tap In: After successfully registering, students tap in on the RFID scanner using the card

User Database: The system then checks the student database :

- If students have not tapped in, they are asked to enter an OTP (One Time Password).
- If students have tapped in before, they will tap out.

Enter OTP: students enter the OTP they received.

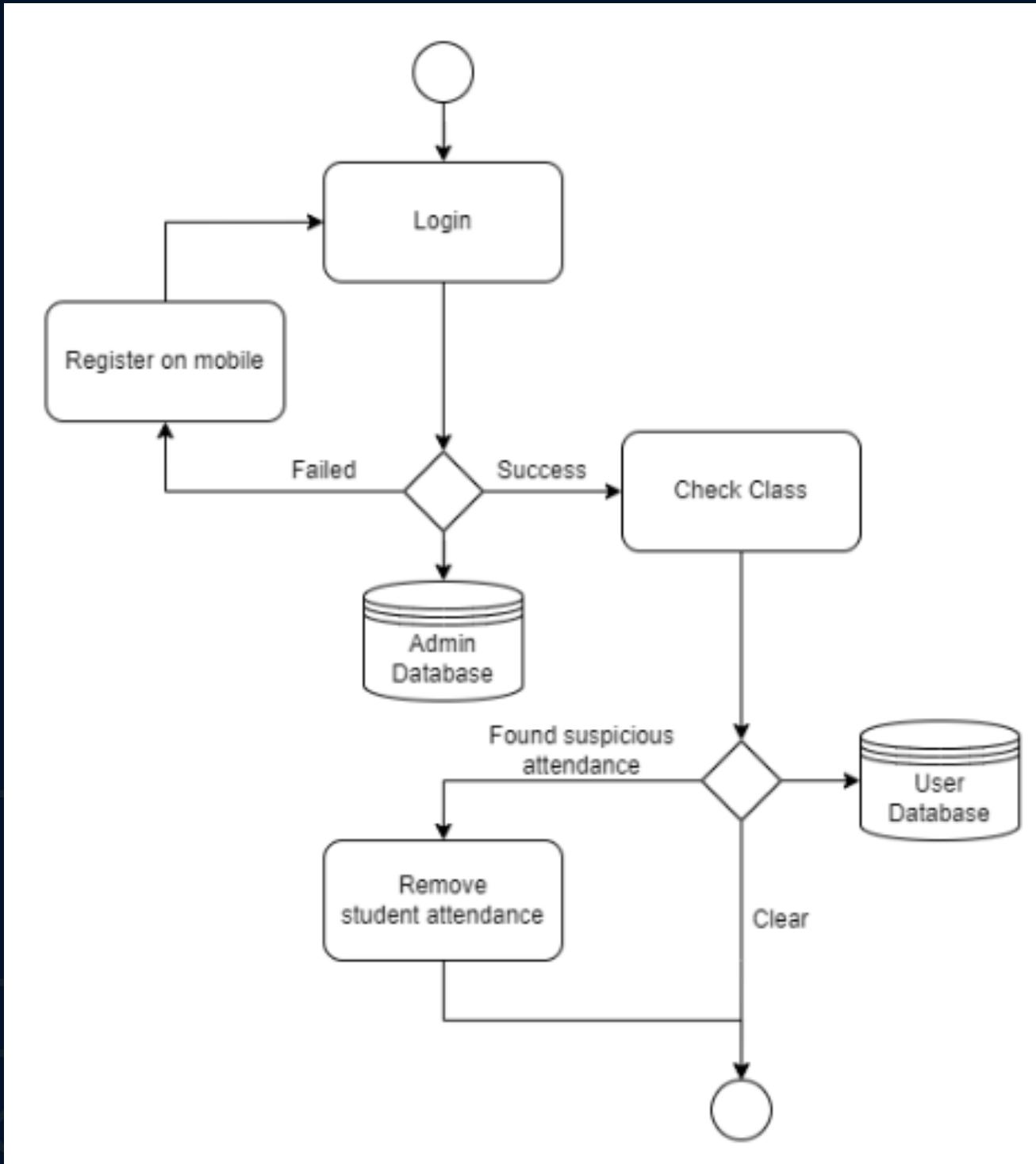
OTP in ESP32: The system then checks the entered OTP :

- If the OTP does not match, the process ends without success.
- If the OTP matches, then the student has successfully missed class.

Tap Out: If a student has tapped in, the next step is to tap out, which marks an absence from class.

FLOWCHART

Lecturer



Login: The lecturer logs into the system.

Register on mobile: If the lecturer does not have an account, the lecturer can register first on the system.

Admin Database: This database contains accounts for lecturers who have registered to gain access to student attendance in class.

Check Class: After successfully registering and logging in to the system, lecturers can check classes, possibly to audit or confirm student attendance.

User Database: This database contains student attendance in class. If there is a suspicious presence, the admin or lecturer can delete the presence.

Remove student attendance: If a student's attendance is considered suspicious, the admin or lecturer has the option to delete the student's attendance record from the system.

COMPONENTS

01

ESP32

Responsible for system control logic, such as the process of reading data from RFID, verifying presence in the database, interacting with LCD displays and managing connections to MQTT and HTTP servers.

02

RFC552

Read the information contained on the user's RFID card to perform attendance

03

BLYNK

Organize classes and meeting weeks, so that the meeting week and class arrangements can be adjusted properly.

04

LCD

Displays presence information such as name, NPM, ID, OTP, and error messages

05

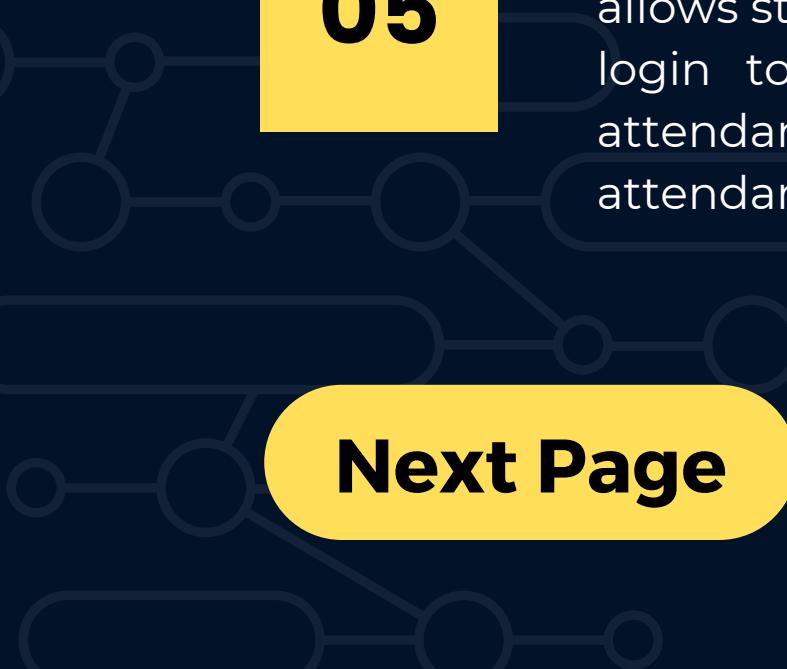
Mobile Application

allows students to register in the database, register and login to lecturers to manage classes and student attendance, and generate OTP for the student attendance system

06

Power Supply

Supplies power to run the device

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FEATURES



RFID

Integration for quick attendance recording.



WEB SERVER

Remote management by lecturers. Students can also register their card and do OTP verification for attendance.



BLYNK

Modular positioning and weekly management



FREERTOS

Real-Time Data Processing

THANK YOU

Demonstration Time!

