A5
FINAL PROJECT

Universitas Indonesia

DanceRTOS User Manual

A guidelines for user and/or client

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About Project

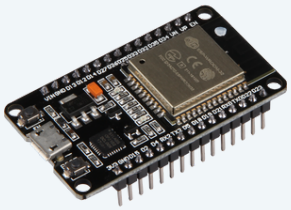
Welcome to the future of modular RFID attendance scanner, **DanceRTOS**! This project, crafted with a blend of passion and carefulness, stands as a testament to our commitment to innovation and efficiency in educational setting. Why *Dance*? From the terminology, dance is taken from the word “atten**dance**” and from the initial phase, we knew we wanted to make something *fun*. Therefore, we hope that the name DanceRTOS is memorable to clients who use this module in their school.

At its core, DanceRTOS is an embodiment of our values: **modularity**, **reliability** and **user-friendliness**. Utilizing the all-reliable ESP32 microcontroller, along with the power of FreeRTOS, our machine offers a seamless and automated attendance tracking experience, whether that’d be for the teachers, students, and administrators. The integration of RFID technology ensures quick and secure identification of students, making the process of marking attendance as simple as a card tap.

The system’s heart beats with the mobile application (available for all mobile OS), providing an intuitive interface for teachers to manage attendance and for students to register their card and verify OTP as a mechanism preventing students from skipping classes. The system also features a separate app Blynk for administrators to change the device’s global class and week settings, making it as **modular** as it could be.

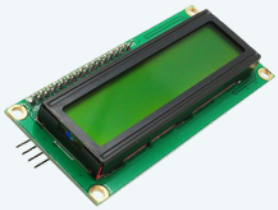
Product Overview

ESP32 & Hardware



ESP32
with Wi-Fi Module

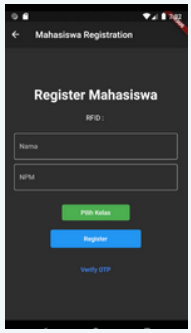
RFC522
Scanner RFID



Adafruit LCD
16x2

Mobile App

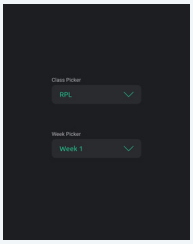
OTP verification for
entrance



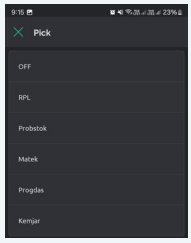
Register card to an
attendance account

Attendance log for
teachers

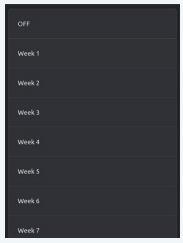
Blynk



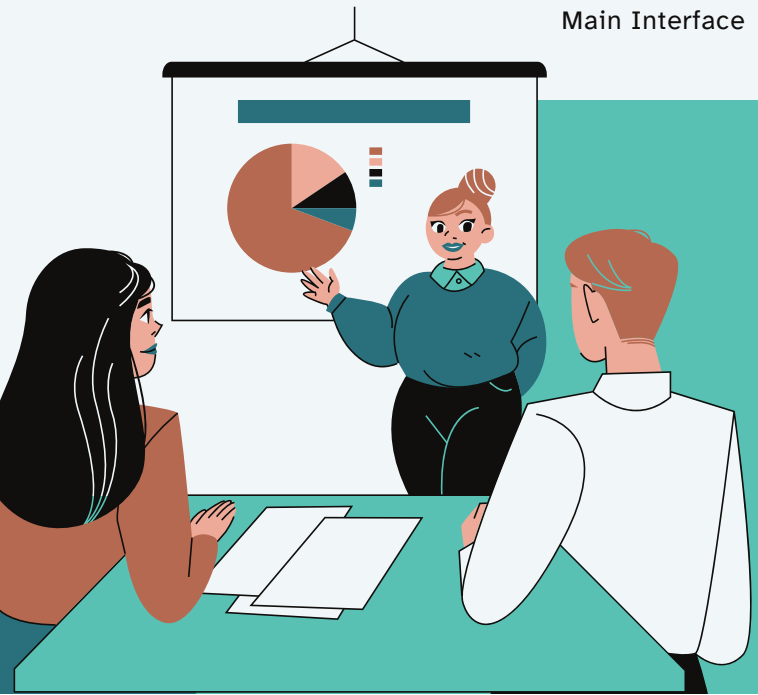
Main Interface



Class Picker



Week Picker



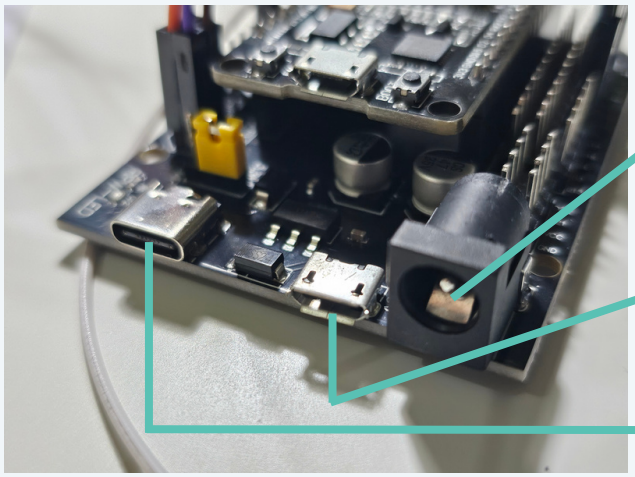
Installation

Installation (for administrator)

1. As administrator, you're obligated to setup the wi-fi connection by uploading the C++ code to the ESP32 with the newly updated hardcoded SSID and password **out of the box** or when network changes occur. Please visit the repository at ***https://github.com/cattyman919/AbsenceSystem*** to provide yourself with the code.
2. Adjust the ***const char* SSID*** and ***const char* PASSWORD*** at **line 33** and **34** to your network environment.
3. Connect your PC to the ESP32 via the **MicroUSB adapter AT THE ESP32, NOT THE EXTENSION BOARD**.
4. Compile and upload the code to the ESP32 board using Arduino IDE.
5. To install it in class site, please refer to **Installation (for client at site)**.

Installation (for client at site)

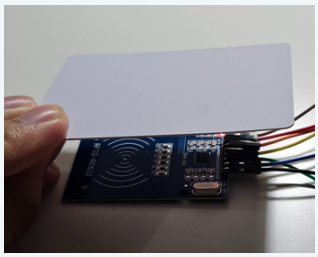
1. Prepare a power supply for the device, at least 6 V DC power supply is required. You can also use the MicroUSB and USB type-C adapter. Refer the connection to the image below.
2. Hang it on a wall or somewhere feasible for students to reach.
3. Connect the device into your desired power supply type
4. Device should be up and running
5. If device is not working, there might be network issues. Please ensure the administrator has done **Installation (for administrator)** prior to this step. If other error occurs, refer to **FAQs & Troubleshooting**.



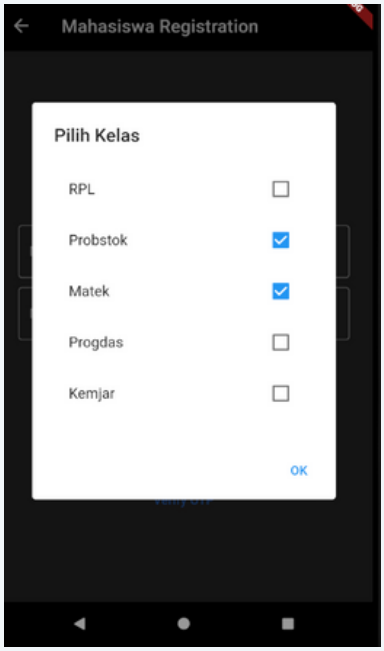
Operation

For Students

1. Prepare your RFID-ready student card. If you have not received one, please contact your school administration support.
2. Tap or hover your card to the scanner.



3. Check the LCD for next instruction.
4. If at step 3 you're required to register, this means your card is not yet linked to an account. Register through the mobile app by referring to the image below, also pick the class you're enrolled to. The application will automatically capture the card ID for registration. After registering, repeat *step 2*.

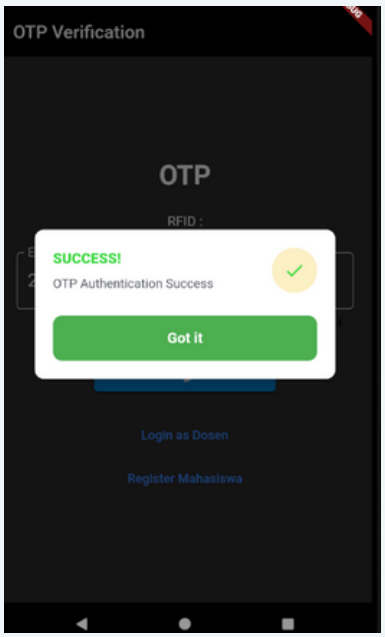


5. If at step 3 you've registered, the LCD will show an OTP code for you to verify inside the mobile app. Note that this OTP lasts only 15 seconds. You'll have to tap again if you miss the threshold.

Operation

For Students (cont.)

6. Quickly type in the OTP in the mobile application under the 15 seconds threshold. The application will automatically capture your card ID. If you succeed, the LCD will show your name and NPM. At this point, your entrance attendance to the class has been recorded.

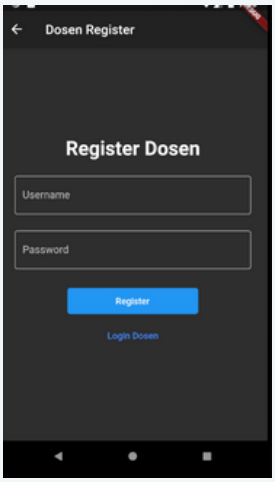


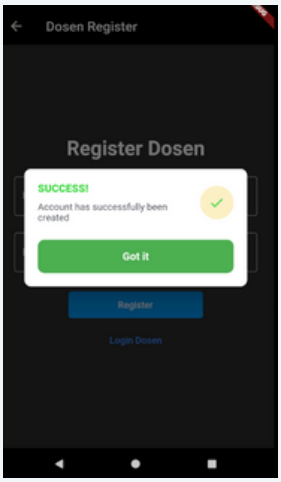
7. When you're leaving the class, don't forget to tap for the second time. If you've mistakenly tapped the second time previously, contact your teacher to delete your data and record your attendance again from *step 2*. To tap the second time to leave, just tap your card and wait for confirmation in the LCD. If you see your name and the message "GOODBYE", your exit time has been recorded.

Operation

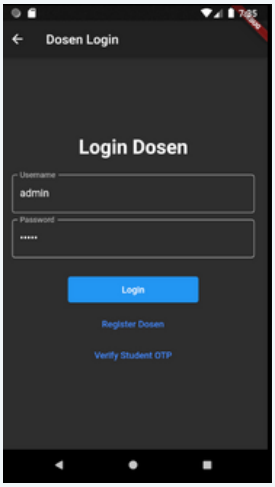
For Teachers

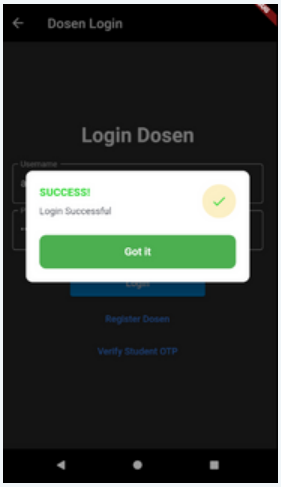
1. If you haven't registered an account, do so by going to the *dosen* login page then tapping the **Register Dosen** prompt.



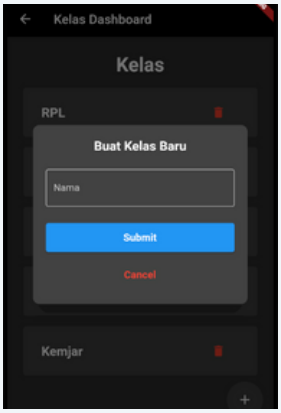


2. Login to your teacher account.





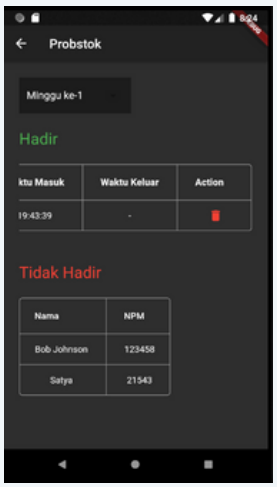
3. As teacher, you can do some privileged actions, such as creating a new class and seeing the attendance log.

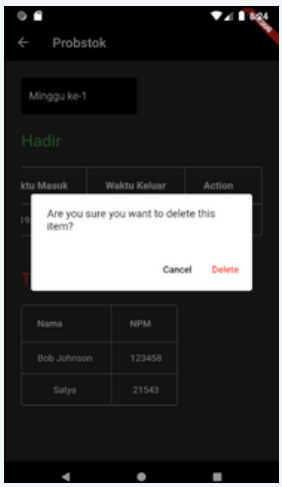


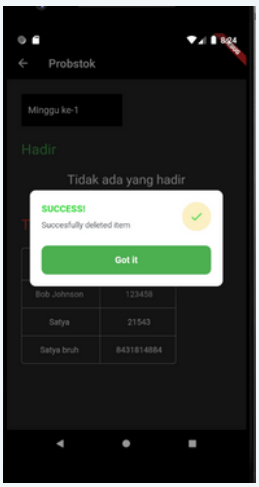
Operation

For Teachers *(cont.)*

4. If you wish to delete a student's attendance record in scenario where you caught them skipping classes but somehow got recorded in the log, you could click the delete icon at the far right of the student's attendance record entry.







5. You can see weekly log by changing the week of the class.

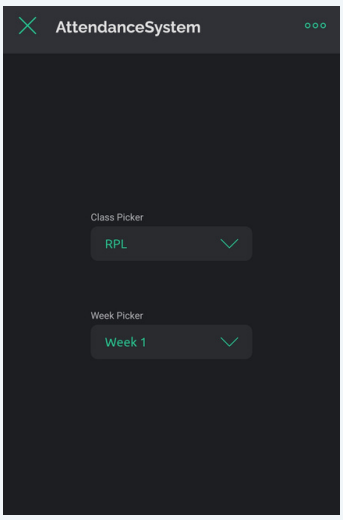
For Administrators

1. As administrator, aside from rightfully eligible to change the code of the ESP32, you are also required to maintain the device and its usage by adjusting it to a certain class and week. Use the provided Blynk app for this.

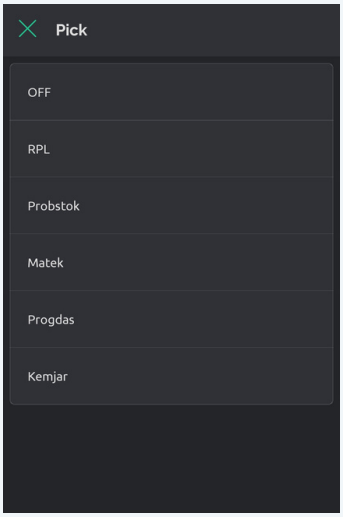
Operation

For Administrators *(cont.)*

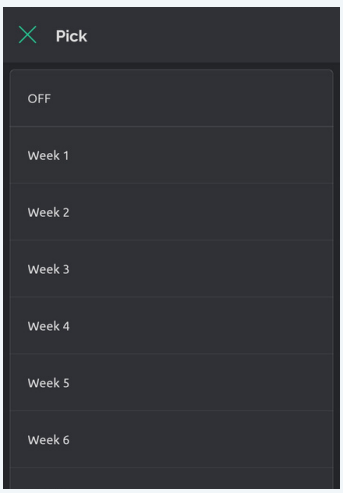
2. At startup, the class and week global variable will not be set and the device will remain idle. As administrator, you must pick the week and class from Blynk app.



3. To choose class, pick from the dropdown menu. This is to ensure modularity of our device.



4. In a weekly basis, ensure to change the week variable in the Blynk app as well.



Dangers & Hazards

Electrical Hazards

- Caution with Power Supply: Avoid connecting or disconnecting power sources while the system is operational to prevent electrical shocks or potential damage to the hardware components.
- Handling Wiring: Take care when handling wires or connections. Ensure the system is turned off before making any changes or adjustments to the wiring.

Security Data Risks

Users should be cautious and not share their login credentials or RFID tags with unauthorized individuals. This can lead to unauthorized access to sensitive attendance data.

Device Handling Precautions

- Careful Handling of RFID Tags: Avoid bending, scratching, or damaging RFID tags. Treat them delicately to ensure accurate identification during the attendance process.
- LCD Display: Be cautious when interacting with the LCD display to prevent any physical damage or mishandling that might affect its functionality.

General Precautions

- Environmental Conditions: Avoid using the system in extreme environmental conditions such as excessive heat, moisture, or direct sunlight, as it may affect the system's performance.
- Maintenance: Regularly inspect the system for any signs of wear and tear. Perform necessary maintenance to ensure the system's optimal functionality.

FAQs & Troubleshooting

- If the scanner doesn't work entirely, ensure that the ESP32 network has been setup correctly.
- If LCD displays, "**ERROR unenrolled**", that means the student isn't registered in the class. Contact administrator to manually register your class.
- If LCD displays, "**ERROR failed**," there might be network issues. Wait for a couple of moments before tapping your card again.
- During network congestion (often occurs), it is normal for the device to be slow at doing HTTP requests. Please be patience. To be sure, hold the card for a couple of seconds before obscuring it.

Student FAQs

- **How do I register my RFID card with the system?** *At first ever tap, you will be instructed to register via the mobile app. Download the application from Play Store (or OS equivalent) and tap when you're inside the register page since the app will capture your card's tag.*
- **What should I do if my RFID card is lost or damaged?** *Contact the IT support or admin in charge of the database to adjust the old RFID tag with the new RFID tag.*
- **Can I check my attendance record online?** *Students aren't allowed to check attendance conventionally, though our public API can be used to access attendance record.*
- **What happens if the RFID reader doesn't acknowledge my card when I tap in?** *Ensure the ESP32 is connected to the internet (if entirely unresponsive). Contact administrator.*

Teacher FAQs

- **How do I access the attendance data for my class?** *Use the mobile app with your credentials to login. Pick your class and the week of attendance.*
- **Can I manually adjust attendance records in case of an error or technical issue?** *Teachers are only allowed to delete existing record, not modify them. This is useful if they caught students skipping class.*
- **What should I do if the system goes offline during class?** *Resort to paper attendance (for now).*
- **Is there a way to integrate this attendance data with our existing school management software?** *Yes, the API is free. Just make sure to use your student's database.*

Administrator FAQs

- **Can I schedule class and week updates in advance through the Blynk app?** *No.*
- **Can multiple admins operate the Blynk app concurrently for different classes?** *With further tinkering, yes.*
- **How frequently should I update the class and week settings in the Blynk app?** *For week setting, weekly basis. For class, no need unless you reboot the device.*

DISCLAIMER MESSAGES

WARRANTY COVERAGE

A DanceRTOS device comes with a 12-month warranty from the date of purchase. This warranty covers any defects in materials and workmanship under normal use. During this period, any faulty components will be repaired or replaced at no additional cost, subject to the following conditions:

1. Warranty Limitations
    a. The warranty does not cover damages caused by improper installation, misuse, modifications, or accidents.
    b. Regular wear and tear, or damage from environmental factors, are not covered.
    c. Unauthorized repairs or alterations will void the warranty.
2. Service Procedure
    a. To obtain service under this warranty, please contact our customer service team with your purchase details and a description of the issue.
    b. Our team will guide you through the troubleshooting process and, if necessary, provide instructions for service or replacement.
3. Post Warranty Support
    a. After the expiration of the warranty, we continue to offer repair and support services at a nominal fee.

ACKNOWLEDGEMENTS

We extend our heartfelt gratitude to everyone who contributed to the development and realization of DanceRTOS, especially open-source contributors. Special thanks to our dedicated A10 team members for their tireless efforts. Our appreciation goes out to the open-source community for the resources and inspiration that significantly contributed to this project.

FINAL NOTE

Thank you for choosing DanceRTOS. We are committed to providing our customers with high-quality, innovative products and excellent customer service. Your satisfaction and success with our product are of utmost importance to us. We look forward to your feedback and hope our system serves your needs effectively. For any assistance, queries, or feedback, please do not hesitate to reach out to us. We are here to support you on your journey with *Dance*. Welcome to a smarter, more efficient way of managing attendance!

SCAN ME

SCAN ME

OR VISIT

www.github.com/cattyman919/AbsenceSystem (Main Repo)
www.github.com/styxnanda/RTOS32-Attendance/tree/Proto-RTOS (Official Fork)