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PAASCU LEVEL II: Higher Education
(Philippine Accrediting Association of Schools, Colleges and Universities)

PROJECT PROGRESS REPORT

ARDUINO: AUTOMATIC TOLL GATE

GROUP #4

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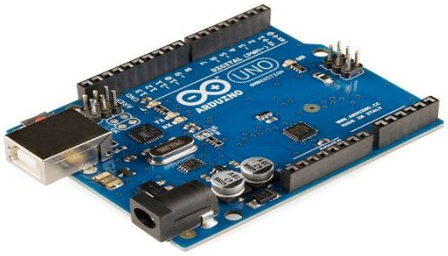
I. Project Overview

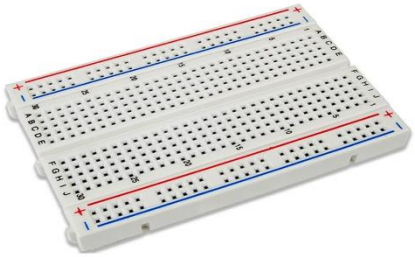
Our Arduino project is all about creating an automatic toll gate system designed to automate entry and exit in a school or subdivision. This project focuses on using Arduino technology to control the opening and closing of the gate automatically, reducing the need for manual operation.

The main goal of our project is to improve security and monitoring through the use of modern technology. By integrating sensors and automated components, the system can detect vehicles and manage access efficiently. This helps ensure that only authorized vehicles can enter or exit the area, making the environment safer and more organized.

Overall, our Arduino-based automatic toll gate system demonstrates how simple electronics and programming can be used to solve real-world problems in security and traffic management

II. Components Used

	Arduino Uno- Serves as the main microcontroller that controls the entire system.
	RFID Module - Reads RFID cards for authentication.

	RFID Cards/Tags- Used to identify authorized users.
	Servo Motor- Controls the opening and closing of the toll gate barrier.
	Ultrasonic Sensor - Detects approaching vehicles.
	Breadboard- Used for temporary circuit connections.

	Jumper Wires – Connect components to the Arduino.
	Power Supply/USB Cable – Provides power to the system.

III. Progress Overview

Phase 1 — Planning and Research

In this phase, the team discussed the project idea and researched how automatic toll gate systems work. We identified the materials needed such as Arduino board, servo motor, sensors, jumper wires, and breadboard. We also planned the circuit design and system flow.

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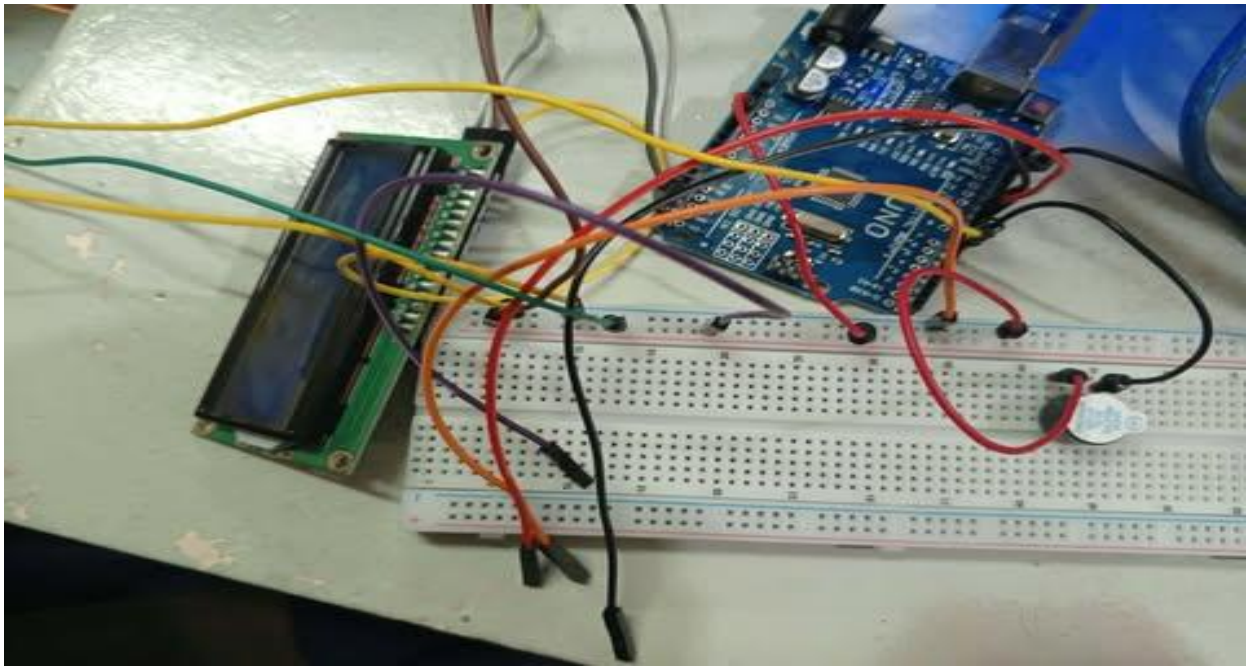
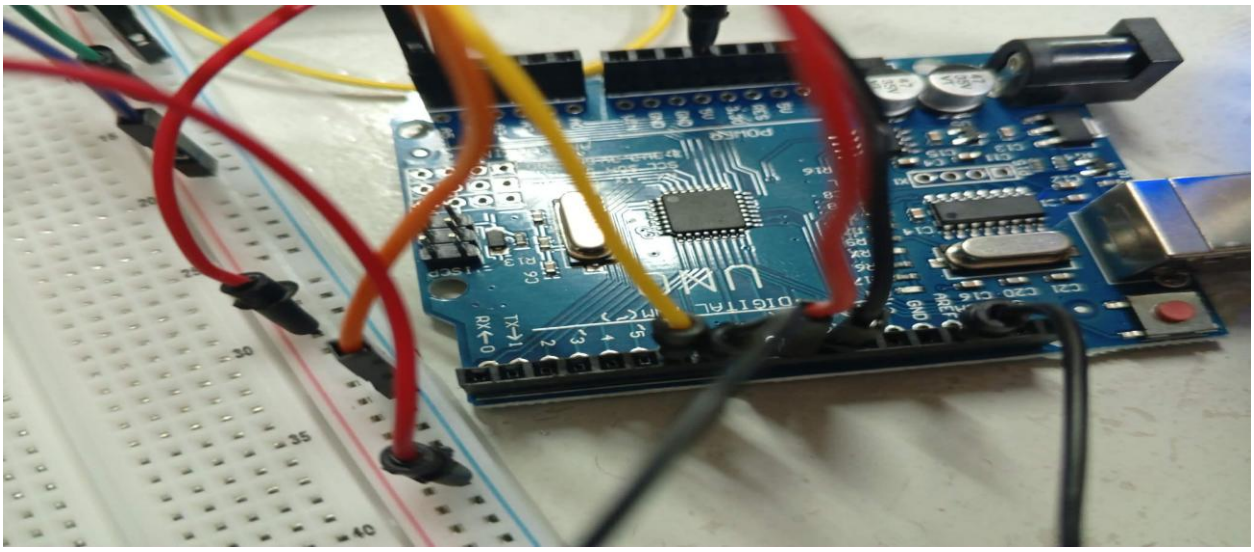
Phase 2 — Hardware Setup and Assembly

During this phase, we assembled the components. We connected the Arduino board, servo motor (for the gate), and sensors on the breadboard. We ensured that all wiring connections were correct and secure.

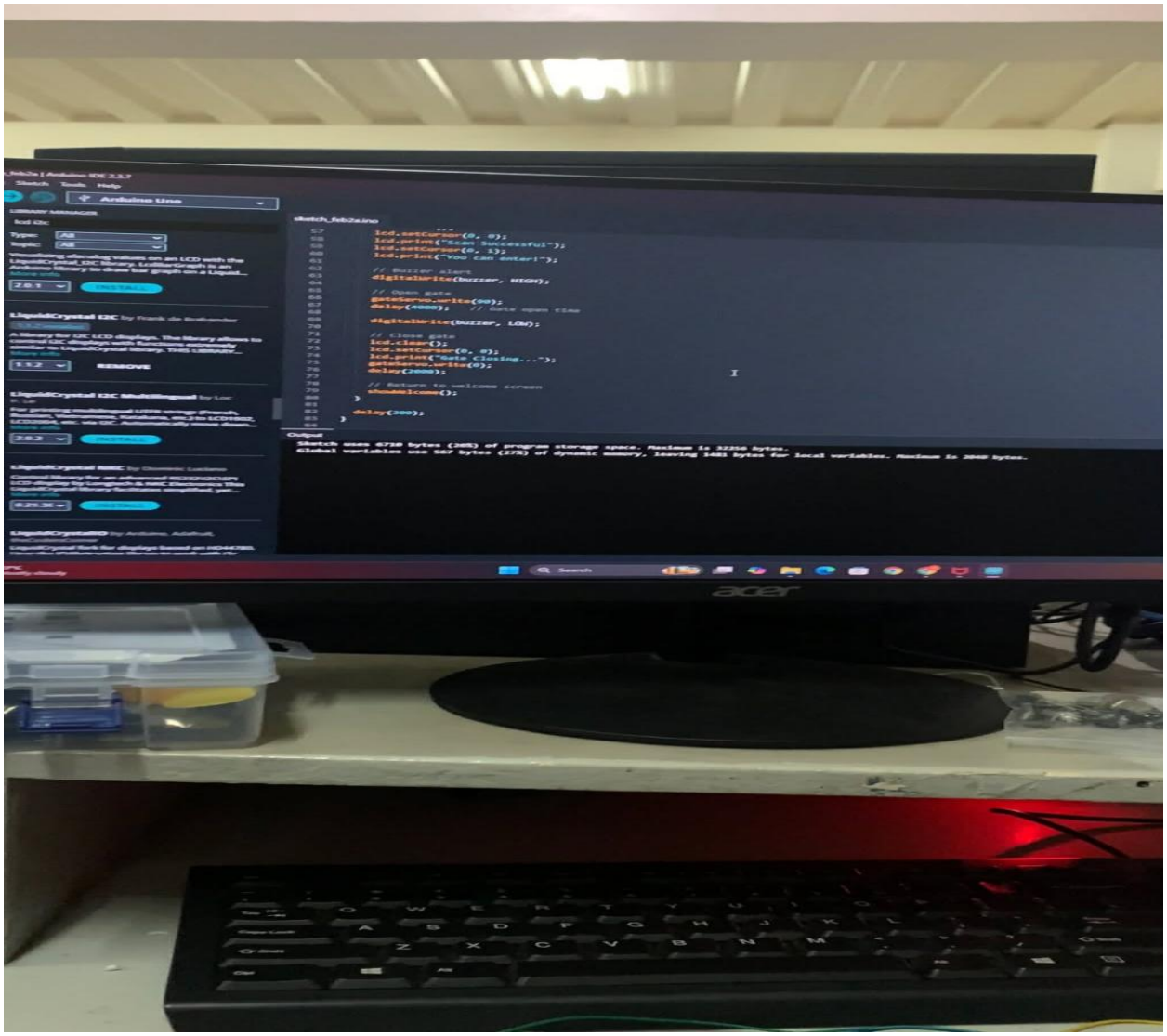
On February 2, our group made initial progress on the project. Although the progress was small, it was an important step in building our system.





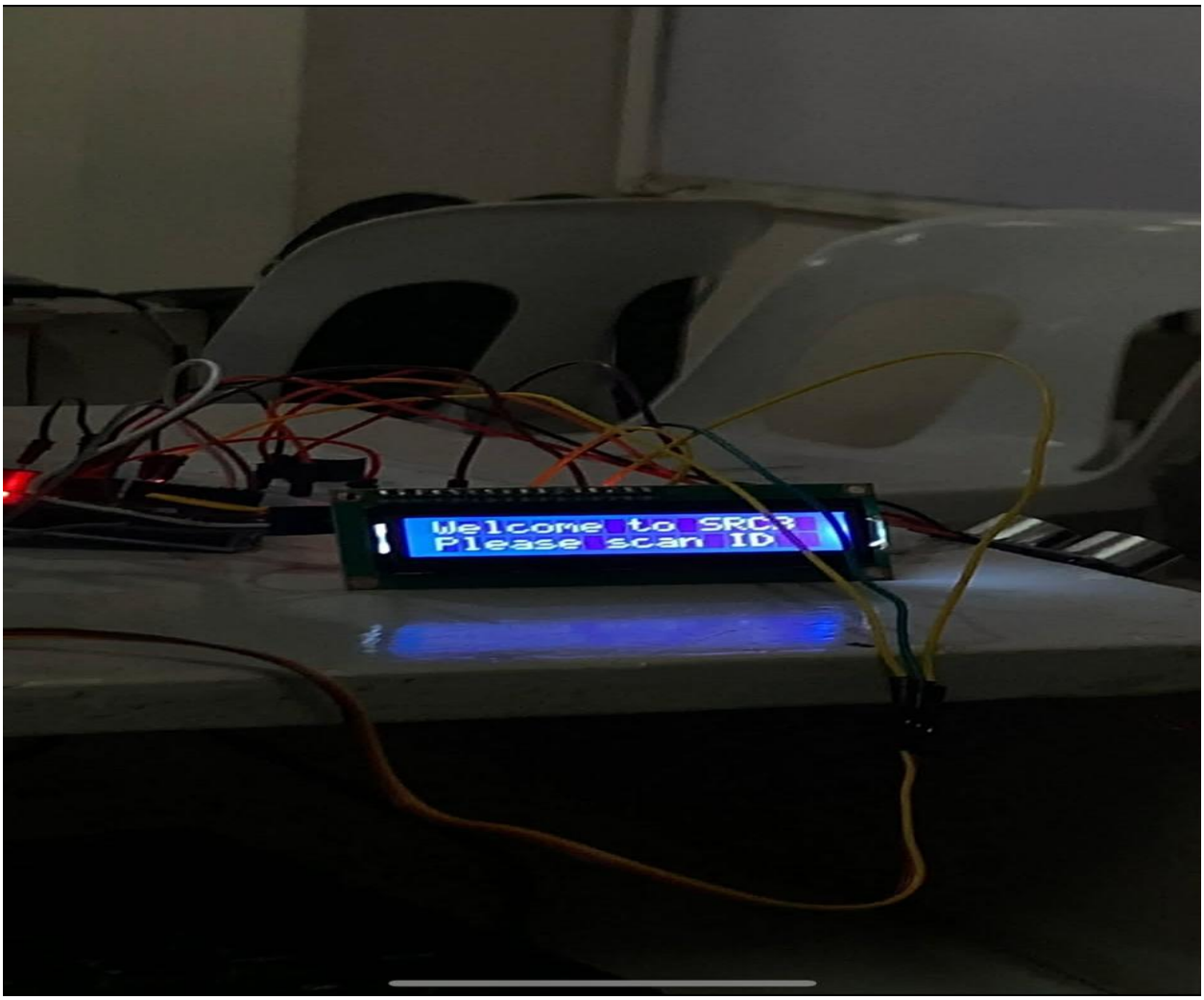
Phase 3 — Programming and Testing

In this phase, we wrote the Arduino code to control the automatic gate. We programmed the system so that when a vehicle is detected, the gate opens automatically and closes after a few seconds. We tested the system multiple times to fix errors and ensure proper function.



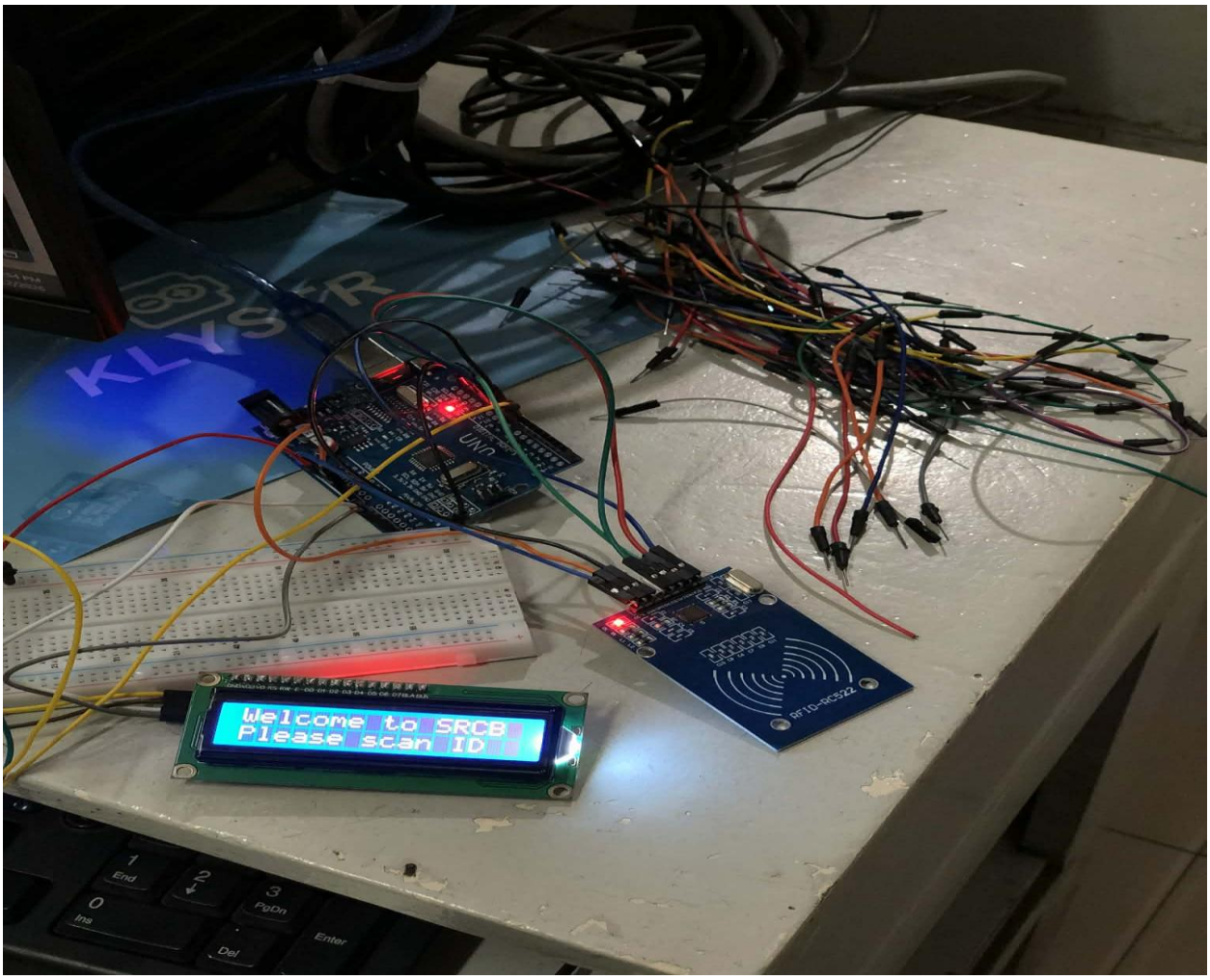
Phase 4 — Testing

In the final phase, we conducted complete testing of the project.



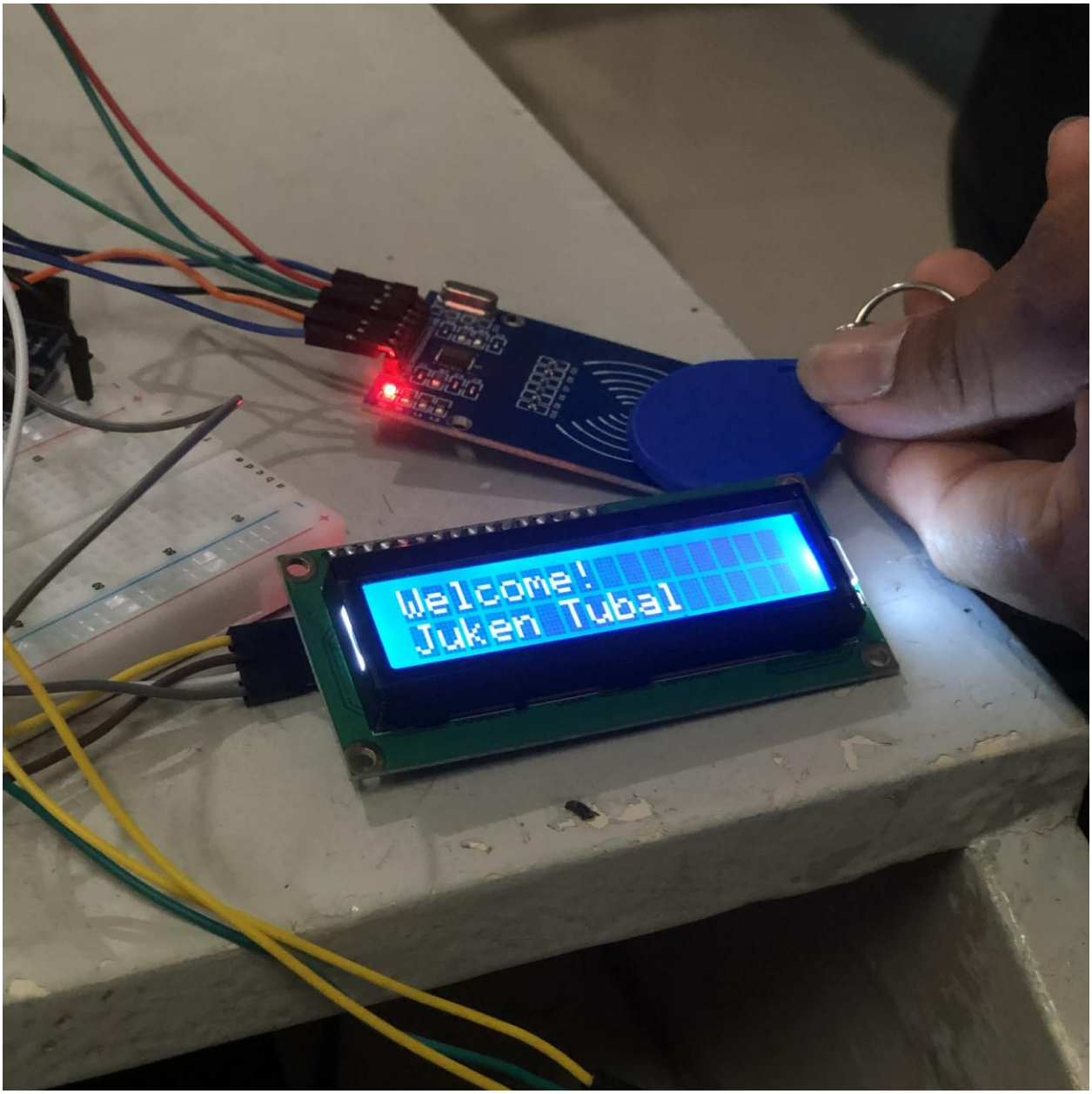
Phase 5 — RFID Setup

On February 12, we connected the RFID module to the Arduino.



Phase 6 — Testing

Testing the RFID.



IV. Project insights and challenges

What the Team Learned

One of the main challenges we faced was incorrect wiring connections, which caused the system to malfunction. We also encountered minor coding errors such as incorrect pin assignments and syntax mistakes. Another challenge was organizing the components inside the diorama structure while keeping the wiring neat and secure. We solved these issues by carefully reviewing the circuit connections, testing each component individually, and debugging the code step-by-step.

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V. FUTURE WORK AND PLANNED ACTIVITIES

In the next phase of development, our team plans to enhance the Arduino Automatic Toll Gate System by integrating an ultrasonic sensor to detect approaching vehicles automatically. This addition will allow the system to sense when a vehicle is near the gate before scanning the RFID card, making the operation more efficient and realistic. We also plan to complete the construction of the diorama model to better represent a real-world toll gate environment. This includes properly mounting all components such as the Arduino board, RFID module, servo motor, and sensors to ensure a clean and organized setup. Improving the wiring arrangement will also be a priority to make the system safer and more reliable. Furthermore, we aim to improve the overall functionality of the system by refining the code, minimizing delays, and enhancing the accuracy of the sensor readings. If time permits, we may also add an LCD display to show messages such as “Access Granted” or “Access Denied” to make the system more user-friendly. Through these planned improvements, we expect our project to become more stable, efficient, and suitable for real-world implementation.

VI. CONCLUSION

In conclusion, the Arduino Automatic Toll Gate System project successfully demonstrates how automation and embedded systems can be used to improve security and traffic management in controlled areas such as schools or subdivisions. By integrating Arduino technology with RFID authentication and a servo-controlled gate mechanism, we were able to simulate an automated toll system that allows only authorized vehicles to pass. Throughout the development process, our team gained valuable knowledge and hands-on experience in electronics, circuit wiring, programming, and system integration. We also improved our troubleshooting and debugging skills while resolving issues related to wiring connections and coding errors. These challenges helped us better understand how automated systems function in real-life applications. Although the project is still being enhanced with additional features such as an ultrasonic sensor and improvements to the diorama model, the current system already demonstrates its core functionality effectively. Overall, this project highlights how simple Arduino components can be used to create practical, innovative, and efficient solutions to everyday problems.