



*PROJECT GROUP 4.1.9*

# GREEN HOUSE AUTOMATION SYSTEM



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# Background



Our project offers a sophisticated smart greenhouse system that automates climate control, lighting, irrigation, water management, and energy efficiency. It uses predictive control for optimal energy use, ensures robust security with RFID and Google Accounts, and supports real-time monitoring and remote management via a Flutter app for iOS and Android.

# PROBLEMS

01. Labor-Intensive & Inconsistent Management

02. Water Wastage

03. Security issues

04. Suboptimal Growing conditions





# Motivation



The Green Automation System aims to enhance greenhouse efficiency by integrating automation technologies. Its objectives are to optimize plant growth, improve resource use, reduce labor, ensure consistent care, and enhance security, ultimately leading to better crop yields and sustainability.



# Aims and Objectives

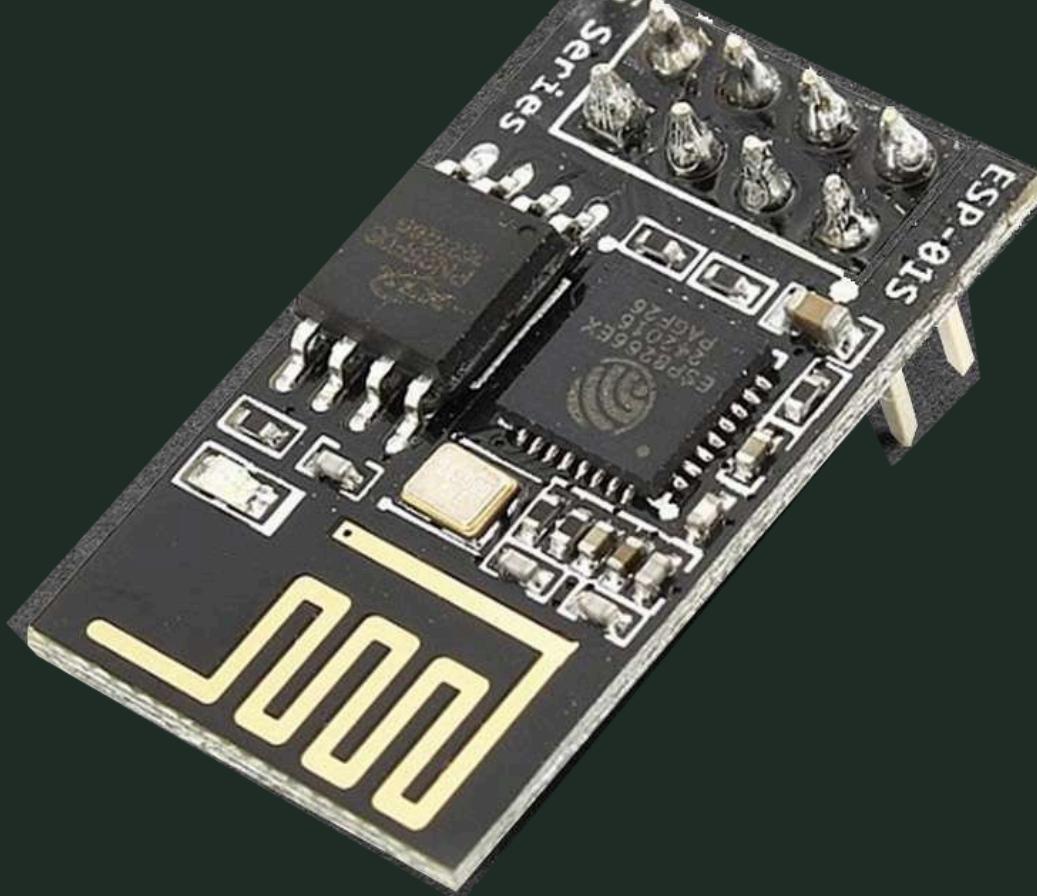
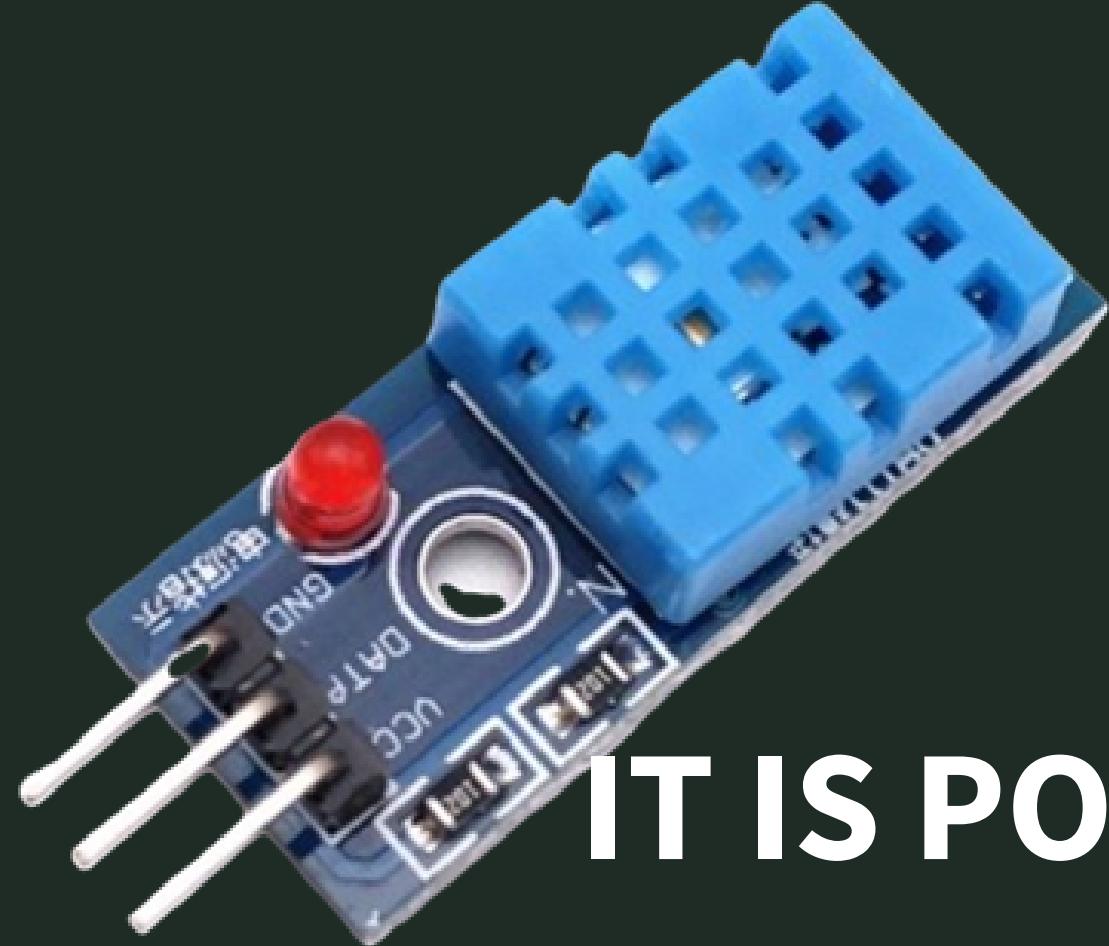


**01. Optimize Plant Growth**

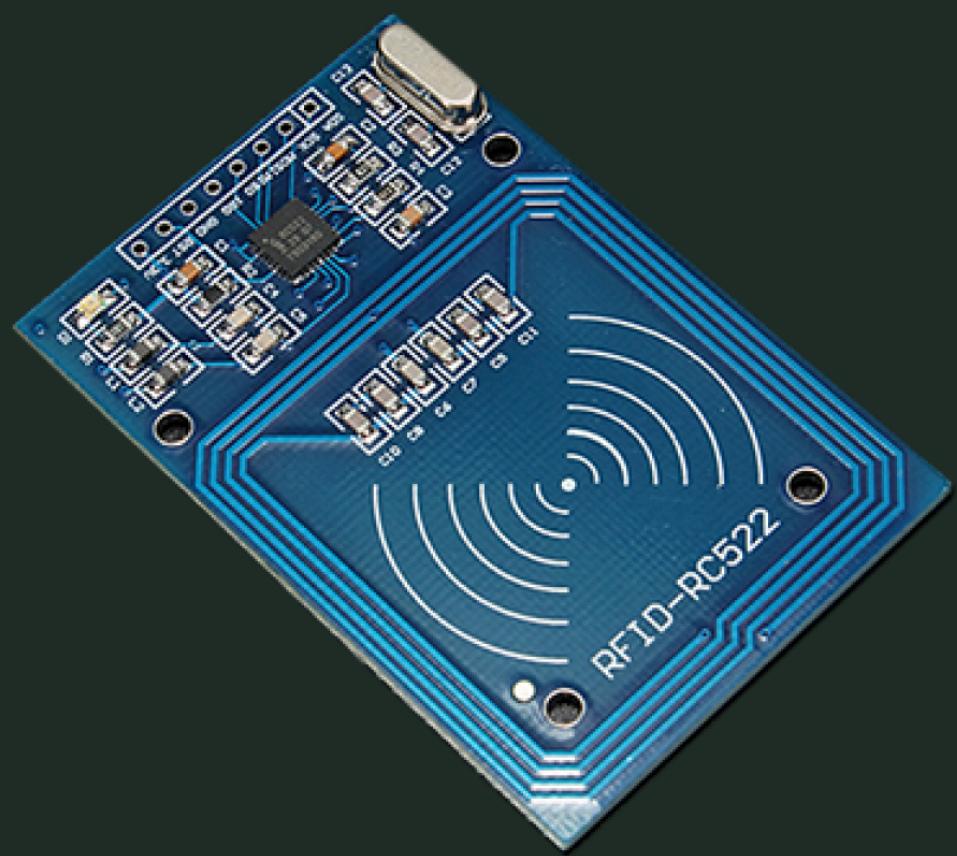
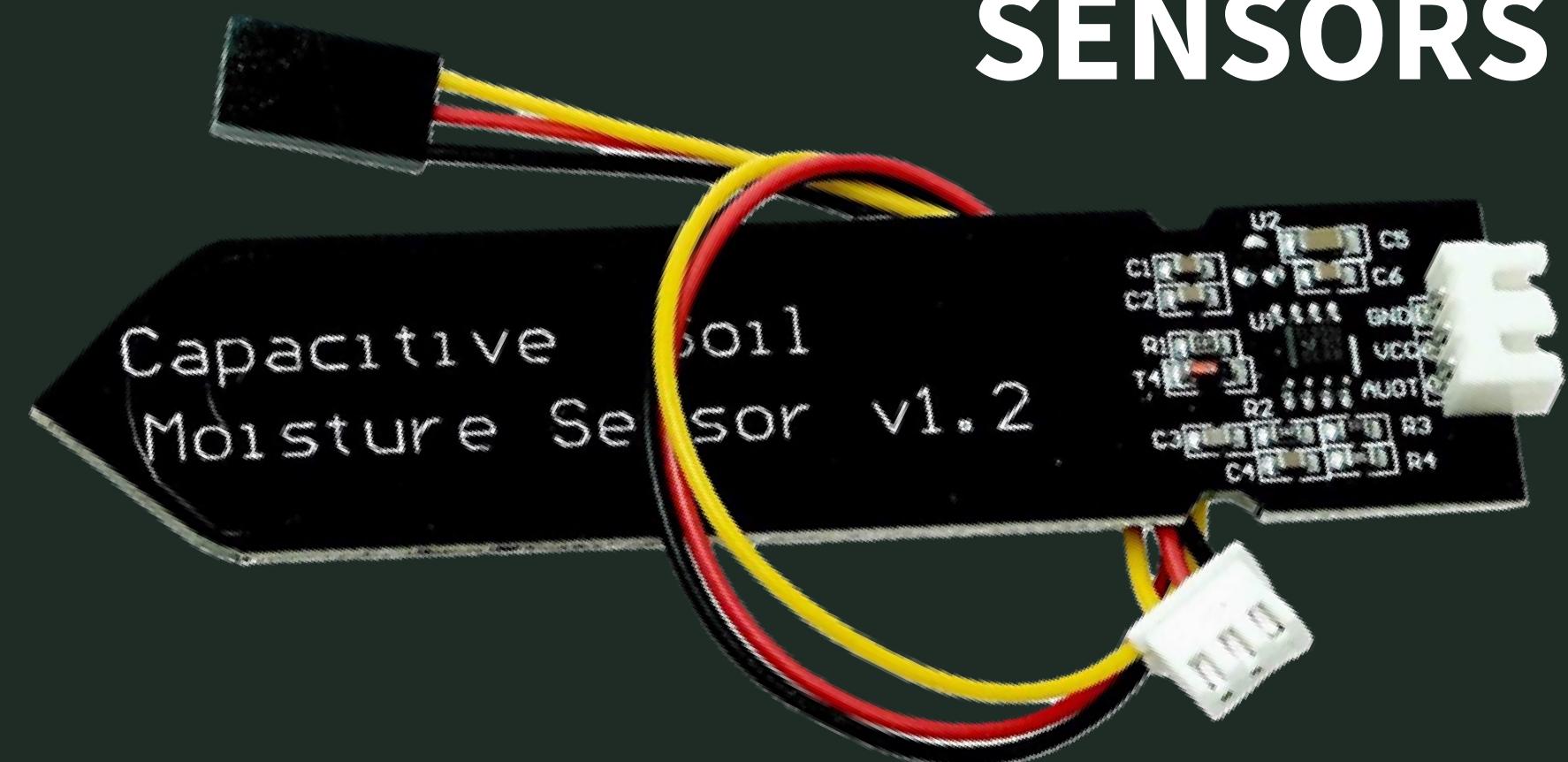
**02. Enhance Resource Efficiency**

**03 Reduce Human Labor**

**04. Improve Security**

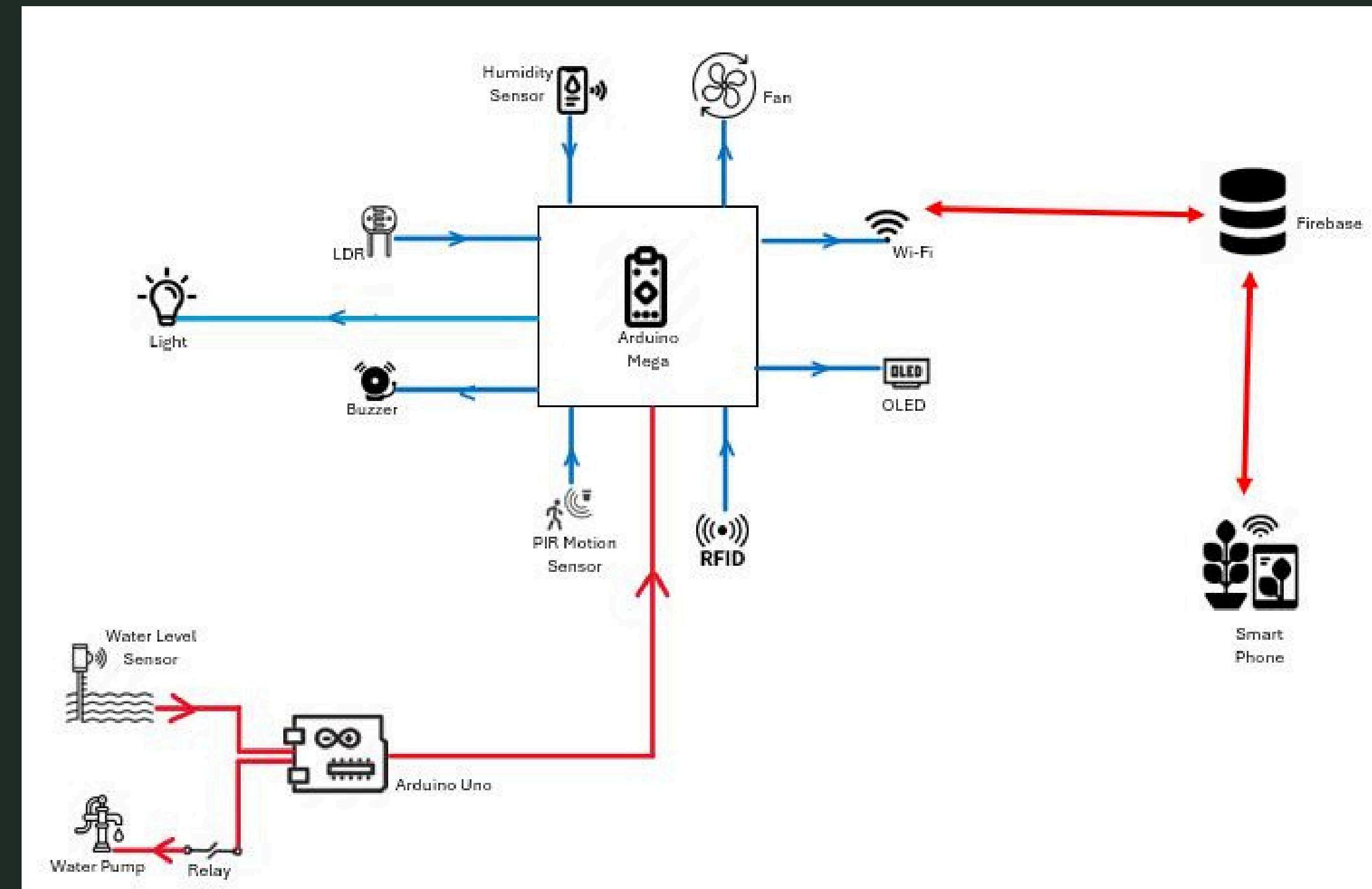


IT IS POSSIBLE BY USING VARIOUS  
SENSORS





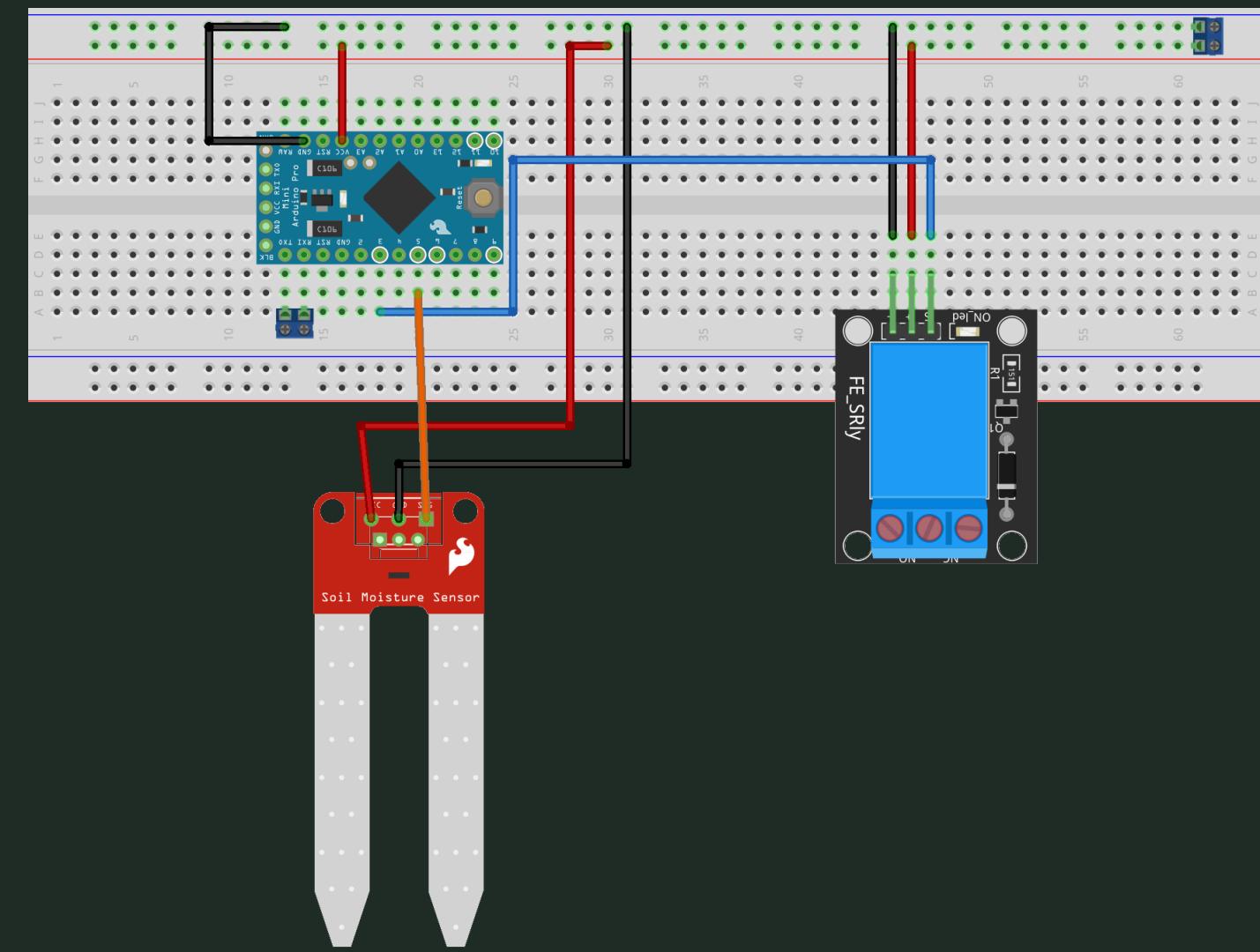
# SYSTEM DIAGRAM





# INDIVIDUAL PLANT CIRCUIT BOARDS

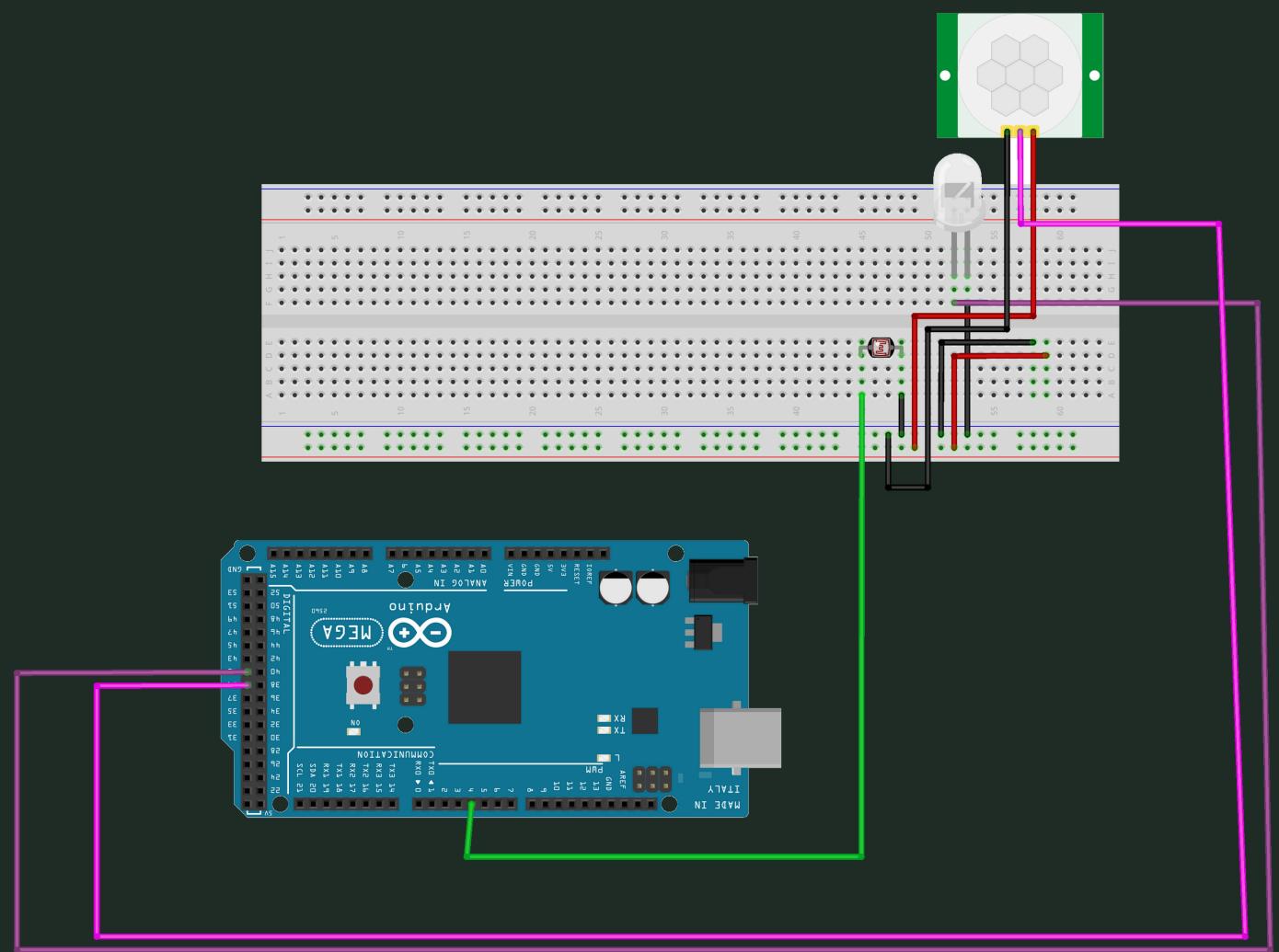
- This system is used for individually monitoring plants.
- It consists of an Arduino Pro Mini, a water level sensor, and a relay.
- The water level sensor detects the soil moisture level of the plant and sends a signal to the Arduino Pro Mini. The board then controls the relay based on this signal.





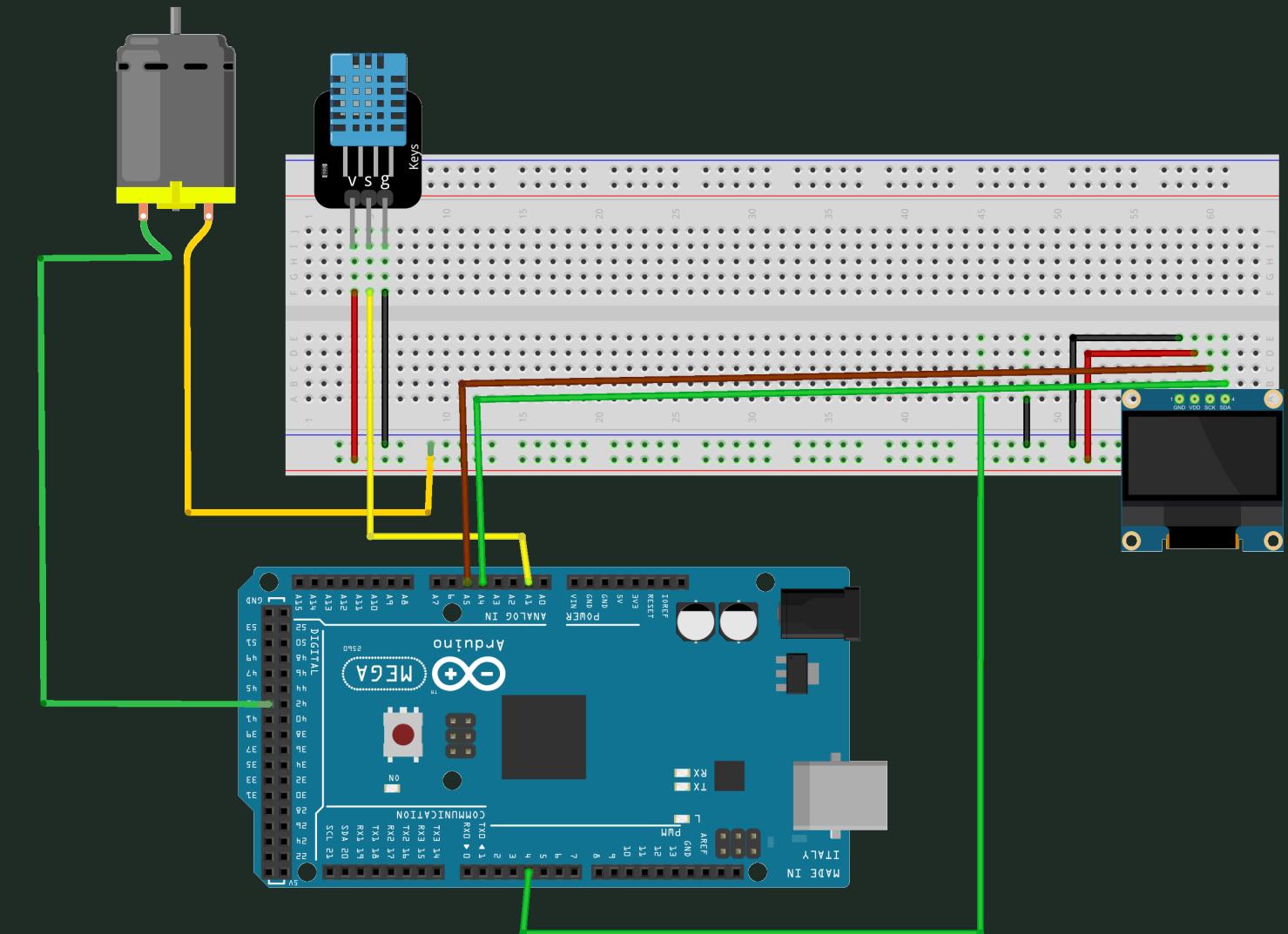
# AUTOMATED LIGHT CONTROL SYSTEM

- The system adjusts lighting automatically based on light levels and detects people in the greenhouse.
- This system use LDR , light source, and motion sensor.
- The LDR and motion sensor are used to detect ambient light conditions and the presence of people, respectively. These sensors send output signals to the Arduino Mega board, which then controls the light source



# HUMIDITY AND TEMPERATURE CONTROL SYSTEM

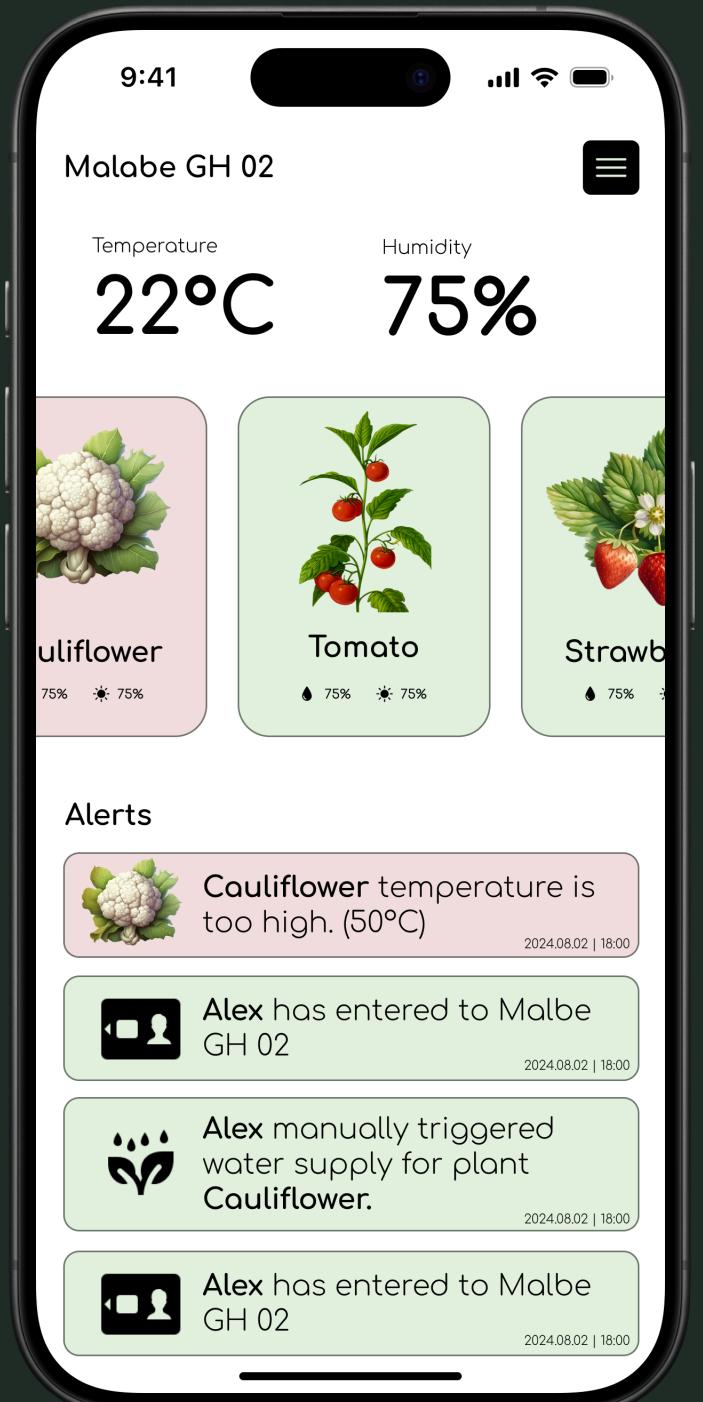
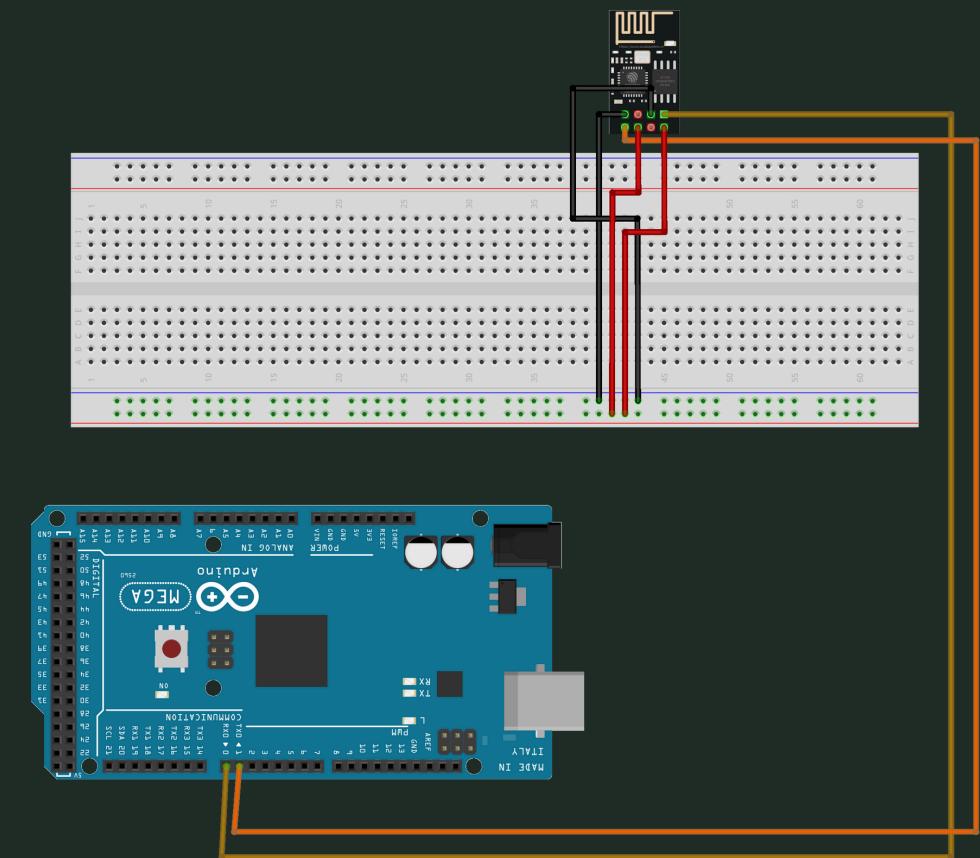
- This system's role is to monitor and control humidity and temperature.
- It uses a DHT11 Temperature and Humidity Sensor, a fan, and an OLED display.
- The sensor monitors the temperature and humidity, then sends output signals to the Arduino Mega board, which controls the fan and updates the OLED display.





# REAL-TIME MONITORING AND CONTROL SYSTEM

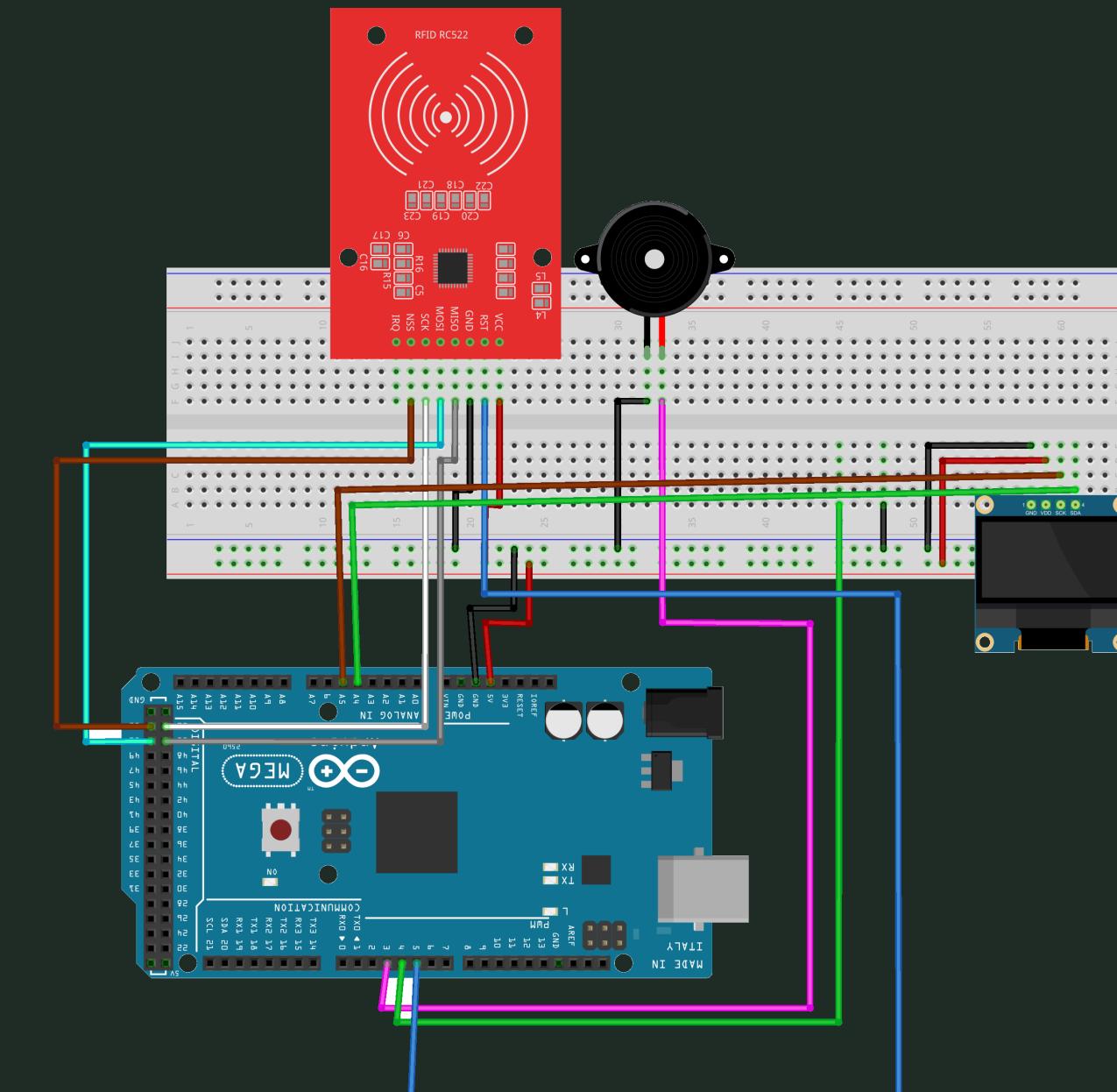
- Real-Time Monitoring and Control System Using a Wi-Fi Module
  - This system connects the mobile app and Arduino board in real-time, allowing users to monitor and control greenhouse conditions remotely.
  - It also detects when someone enters the greenhouse and sends a message to the user.





# SMART GREENHOUSE SECURITY SYSTEM

- The security system helps to ensure greenhouse security and informs the owner when someone enters the greenhouse.
- This system uses an RFID module , buzzer and OLED display .





Let's use 100+ complex sensors for ultimate precision.

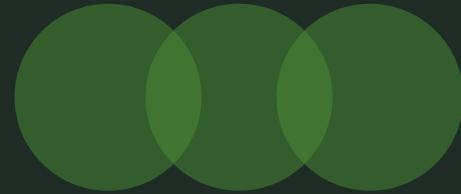




Nah, let's focus  
on functionality  
and scalability.

The images were sourced from a Daily Mail article  
(dailymail.co.uk) and a YouTube video (youtube.com). These  
platforms provide a visual representation relevant to the  
discussed content.





# NO PROBLEM AT ALL !!!

**1,000,000 +**

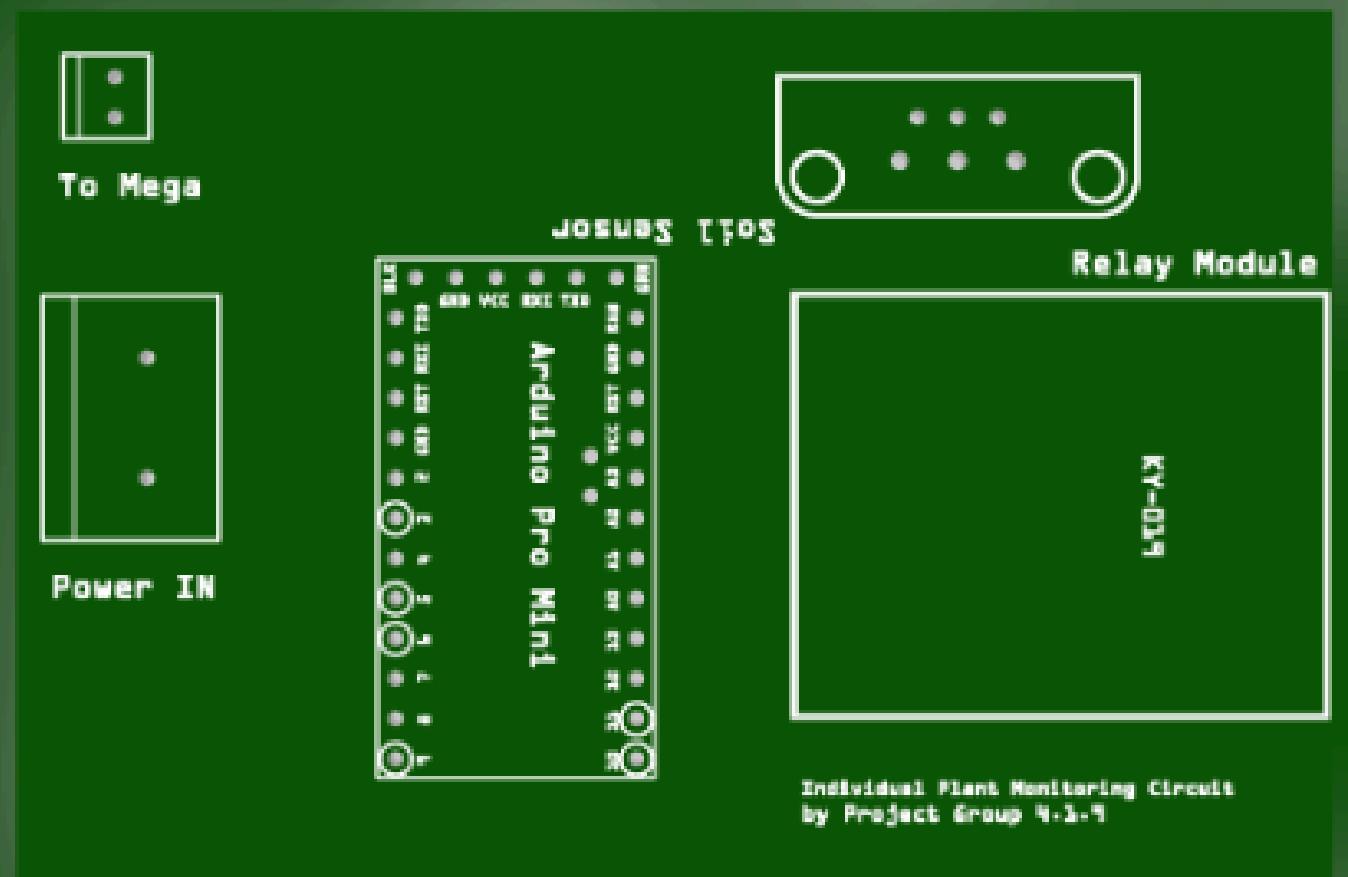
Plants per Green House

**1,000 +**

Green Houses

**10,000 +**

End Points



# Individual Plant Monitoring Circuit

- Each plant monitored by an ATMega168 microcontroller, which is **low-cost**.
- The **circuit is cost-effective and low-maintenance**.
- Demo uses a wired serial connection, with a future upgrade to **radio signals** replacing wired connections.
- Future system will use protocols like Zigbee to create **mesh networking** for supporting larger setups.



# The State-of-the-Art Smart Greenhouse

## UNLIMITED

Real Time Data Logging

Unlimited real-time data logging provides continuous, immediate insights into operations, allowing for instant decision-making. The key factor is the customer's budget, as costs can vary based on data volume and system complexity. The more a customer can invest, the more they can fully utilize this technology.





# The State-of-the-Art Smart Greenhouse

## Artificial Intelligence

Yeah, the buzzword

In the future, AI will be integrated into the system to offer predictive maintenance and personalized plant care recommendations. This will enhance efficiency by anticipating issues before they arise and optimizing plant care based on data-driven insights.





# Real Men Test in Production 💀

Why waste time? Let your users do the testing! Push that code live and let the real world be your QA team. Ahh, **just kidding!** We're not that reckless. We'll actually use a few software testing methods to make sure the build quality is solid. From unit tests to integration tests, **we'll make sure things don't blow up... at least not on purpose.**



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NEWS

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Microsoft

By John Walker Published July 25, 2024

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## A Quote from a Great Mind

*"Your most unhappy customers are your greatest source of learning."*

Bill Gates



# THANK YOU

By the way, try guessing the prompt we used to generate this image.