Team Contributions Worksheet

This document outlines the individual contributions of each team member to the project, detailing the specific tasks performed and the time allocated to each. It serves as a transparent record of effort and responsibility, ensuring clarity and accountability within the team.

Project Overview and Goals

Our project focuses on developing a Smart Access Door System designed to enhance security, safety, and flexibility. Unlike traditional doors, the system integrates multiple authentication methods (RFID cards, keypad PINs, and emergency unlock) combined with real-time monitoring using IR, Fire, and Magnetic sensors.

The solution is built on the ESP32 microcontroller, with Supabase as the backend for authentication and cloud logging, MQTT for lightweight communication, and a user-friendly web application for remote control and monitoring.

Key Goals:

- Integrating multiple sensors with ESP32 to ensure secure and real-time door operation.
- Providing secure authentication and cloud-based logging through Supabase.
- Enabling reliable door control and alerts via MQTT communication.
- Delivering an intuitive web application for user access, monitoring, and history logs.

Summary of Team Contributions

This table provides a comprehensive overview of each team member's primary responsibilities and the time committed to their respective tasks, highlighting the distributed effort across critical project areas.

Omar Osama Fouad	Implemented hardware wiring and connections for ESP32 with all sensors (RFID, IR, Fire, Magnetic), and tested functionality	4 days
Shahd Mohamed Ibrahim	Designed and managed Supabase database, created tables (users, logs, alerts), configured authentication and integrated with the system	3 days
Shada Saeed Mohamed	Prepared the presentation and documentation, organized requirements, contributed to prototyping, and assisted in testing	3 days
Yassmin Hossam Hassan	Developed the Web Application using React.js, implemented main pages, and integrated frontend with backend services	4 days
Yassmin Ashraf Mahmoud	Handled MQTT integration between ESP32 and the cloud, supervised system integration, and ensured smooth communication	3 days

Key Learnings and Challenges

> **"Every challenge is an opportunity for growth. Our project's complexities honed our problem-solving skills and strengthened our collaborative spirit."**

Throughout the project, the team encountered various technical and collaborative challenges that provided valuable learning experiences:

- **Hardware-Software Integration:** One significant challenge was ensuring seamless communication between the diverse sensor hardware and the software components. Debugging data inconsistencies and ensuring reliable data flow required extensive testing and iterative adjustments.
- **Real-time Data Handling:** Managing and displaying real-time data from multiple sensors posed challenges in terms of latency and data synchronization, particularly with the MQTT and Supabase integration.
- **Version Control and Collaboration:** Coordinating development efforts across different team members and integrating their work smoothly highlighted the importance of robust version control practices and clear communication protocols.
- **Optimizing Performance:** Ensuring the web application was responsive and efficient, especially when handling a large volume of data or multiple simultaneous users, required careful optimization of both frontend and backend code.

Conclusion and Future Work

The successful completion of this project demonstrates our team's ability to design, develop, and integrate a complex smart home system from concept to functional prototype. Each team member's specialized contribution was vital to overcoming technical hurdles and achieving the project objectives.

Looking ahead, several avenues for future work could enhance the system's capabilities:

- **Advanced Analytics:** Incorporating machine learning algorithms for predictive maintenance or anomaly detection based on sensor data.
- **Voice Control Integration:** Adding compatibility with popular voice assistants (e.g., Alexa, Google Assistant) for hands-free control.
- **Energy Management Features:** Developing functionalities to monitor and optimize energy consumption within the home.
- **Scalability Enhancements:** Further optimizing the system to support a greater number of devices and users with minimal performance degradation.

This project serves as a strong foundation for continued innovation in smart home technologies.