MAMS SISO

Digitizing attendance at Mass Academy

Tarun Eswar, Charles Tang, David Barsoum

1. Project Overview

Problem

- Sign-ins/outs lack regulation at Mass Academy
- Hundreds of sheets of paper are wasted each day with written sign-ins
    - Requires time and effort to manually rotate the sheets each day
- Paper sign-ins consume time (i.e. signing name/recording time)
- Inability to trace historical records
- Student location’s are unknown
    - When students leave the building and come back there’s currently no method to record all of these times
    - Understanding if student’s are at MAMS/left the school

Minimum Viable Product

1. Allow the student to sign in and sign out using an easily accessible personal identifier for each student.
2. Collect the sign-in/out data into a database that tracks sign-in and sign-out times, attendance by each date, and the student's unique personal identifier.
3. Provide a user interface web page or application that allows administrators to access daily reports and query attendance data.

Description

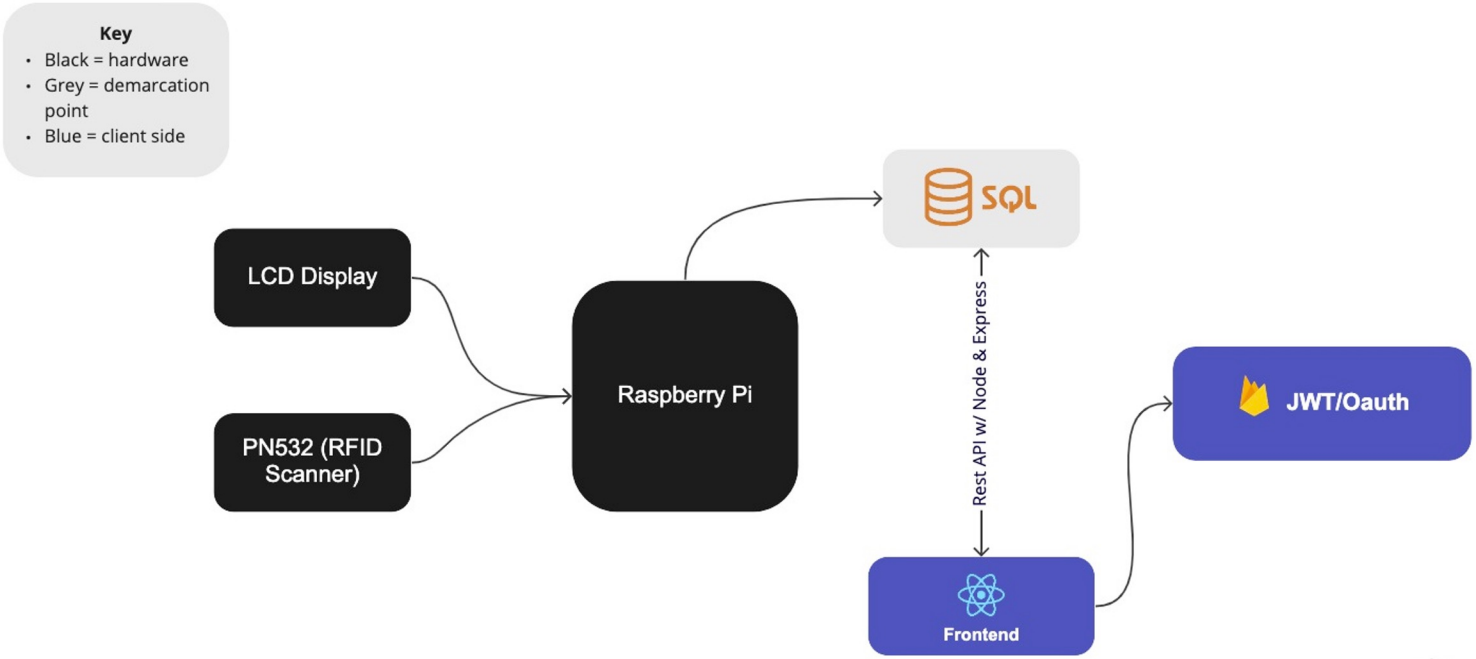
Front-end

- The application contains screens for daily logs, historical, recent entries, and settings page
- Each page provides admins with full control over logs, setting student information and more

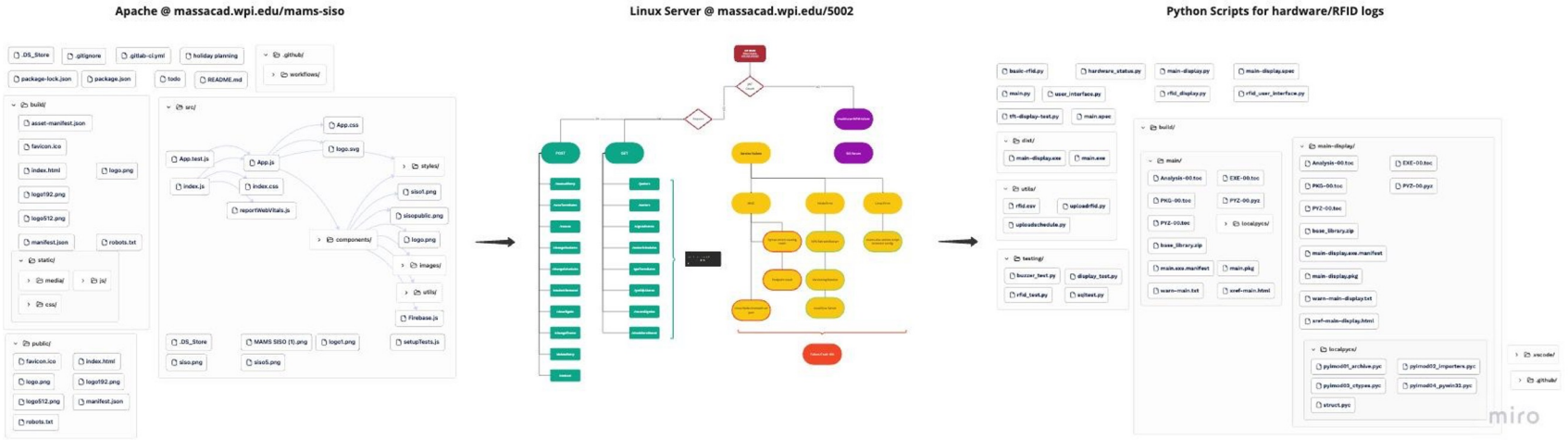
Hardware

- Base level of stack with RFID capabilities to record student logins
- Reads in key fob identifiers (configured)

High-Level Flow Chart



Technical Flow Chart/Stack



not inclusive of all features, find more at https://github.com/DigitalSignInMams

Technologies

2. Demonstration

3. Reflection

Project Measurables

~94.4 K

Lines of Code Written Total (software & hardware)

22

JWT Protected API Endpoints

1000+

Successful sign-ins/outs

Key Features

Updated Security

JWT OAuth is standard for admin users and RFID to SQL connections are verified over WPI's Linux servers. All industry standards are followed within our usage of MySQL.

Maintenance

Minimal maintenance is required to keep the system in use. In fact, the system only requires maintenance at the end of each school year. Settings can be altered within our web application.

Verified Logging

The unique RFID hashes ensure that each student is truly signing in at the time specified. In previous sign-in iterations, this level of verification was not provided.

Key Features Cont'd

UI/UX

Administrators can easily access the UI/UX to keep track of daily attendance. This dashboard keeps track of holidays and other events to ensure accurate results.

Facial Recognition

Facial recognition is currently being investigated as a potential means to allow for easier sign-ins for students. Simply walking through the doors will log their entry.

Environmentally Friendly

Our product allows for the reduction of paper previously used to keep track of sign-ins/sign-outs in a manual fashion.

Reflection

Challenges

- Database considerations
- Issues working on WPI server
- UTC/EDT conversion and working with time in general
- Blacklisted from WPI SQL servers for a few days

Acquired Skills

- Utilizing SQL through an institution and hardware debugging
- Last minute fixes = all-nighters!
- The process of creating a top-down stack from front-end to hardware

Future Work

Codebase Work

- Creating a Gitlab CI/CD pipeline for streamlined deployment with WPI
- Kubernetes microservices for scalability
- Further bug fixing and code migration

Longevity Planning

- Fully integrating with the WPI infrastructure
- Transfer planning (i.e. loss of a key fob)
- Whole-school implementation (next year!)

Acknowledgements

Development & Deployment

Mrs. Taricco – Primary Advisor

WPI ARC + IT Team – IT Support & DevOps

Mingle Li, undergrad @ NEU – Provided advice for faster queries

William Chen, student @ Quarry Lane School, CA - Linux service script bug fix help

Mira Murali, SWE @ Amazon – Brute testing for bugs/application feedback

The passive aggressive users that answered our Stack Overflow posts

Misc.

Amy Chen – Artwork

Joshua Schnee – Case Design

Mass Academy Admin + Students – Testing

Questions?

Admin Only

Front end: mams-siso.wpi.edu
API: mams-siso.wpi.edu/api

Public View Next.js Application

mass-academy-sign-in-system.web.app

Organization Git Repo (5 of 7 repos are privated for security reasons)

github.com/DigitalSignInMams

- Contains documentation
- Diagrams
- Log of work