Small Equipment Checkout System

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Problem Statement

Currently students are expected to check out equipment needed for class by way of interacting directly with the ETG's office and borrowing said equipment. While effective, this method can be cumbersome for the ETG staff and has certain limitations that can be hard to overcome.

Solution

Provide an automated system that enables students to check out equipment without having to interact with ETG staff and allow ETG staff to manage checked out equipment without having to manually service students' requests.

Intended Users

- Admin - ETG Faculty who will access and manage the locker system remotely via web browser
- Students – Common user who will check-out/check-in items from locker system and will interact with system via Kiosk

Design Requirements

Function Requirements - User

- Select an available equipment item to checkout
- Return checked out equipment
- LED light to show contents of locker
- Ability to view checked out equipment
- Ability to view available equipment
- Report broken or missing items
- Report broken parts of system
- Ability to choose checkout duration
- Reminders for students in the form of an email

Function Requirements - Admin

- Login/Logout functionality
- View available equipment
- View users(students) who have checked out equipment
- Ability to add new lockers to system
- Add new users
- Set checkout limits in specific items
- Modify privileges of users
- Receive status reports

Non-Functional Requirements

- Code to be maintained by ETG post senior design
- Provide documentation to support future maintenance of system
- Protect personal info of users of system
- Protect system from malicious attacks or accidental harm

Testing

- Unit Testing – Written to test individual components of system in isolation for one another
- Integration Testing – Subsystems were brought together one by one to develop full system of the prototype
- Integrity Testing – Pen-tests were run by members to stress security measures as those measures were implemented
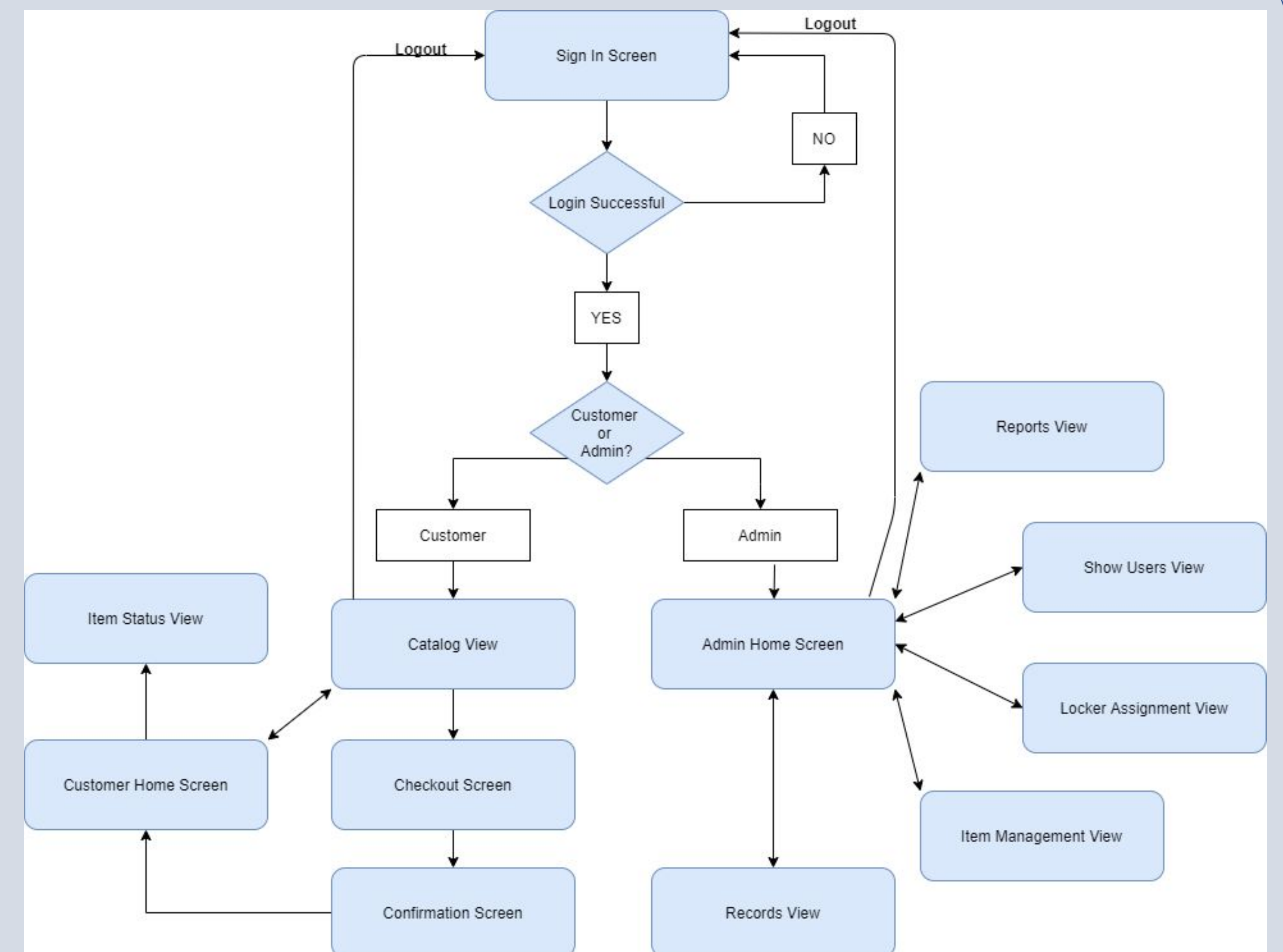
Technical Details

Software		Hardware	
• Node.JS	• Node.JS	• OWFS Server	• LED Light
• MySQL	• React	• PCB Slave Device	• Magnetic Lock
• Ubuntu	• JavaScript	• Raspberry Pi	• Kiosk
• Raspbian	• Sequalize	• 1-Wire System	• Locker Rack

Activity Diagram

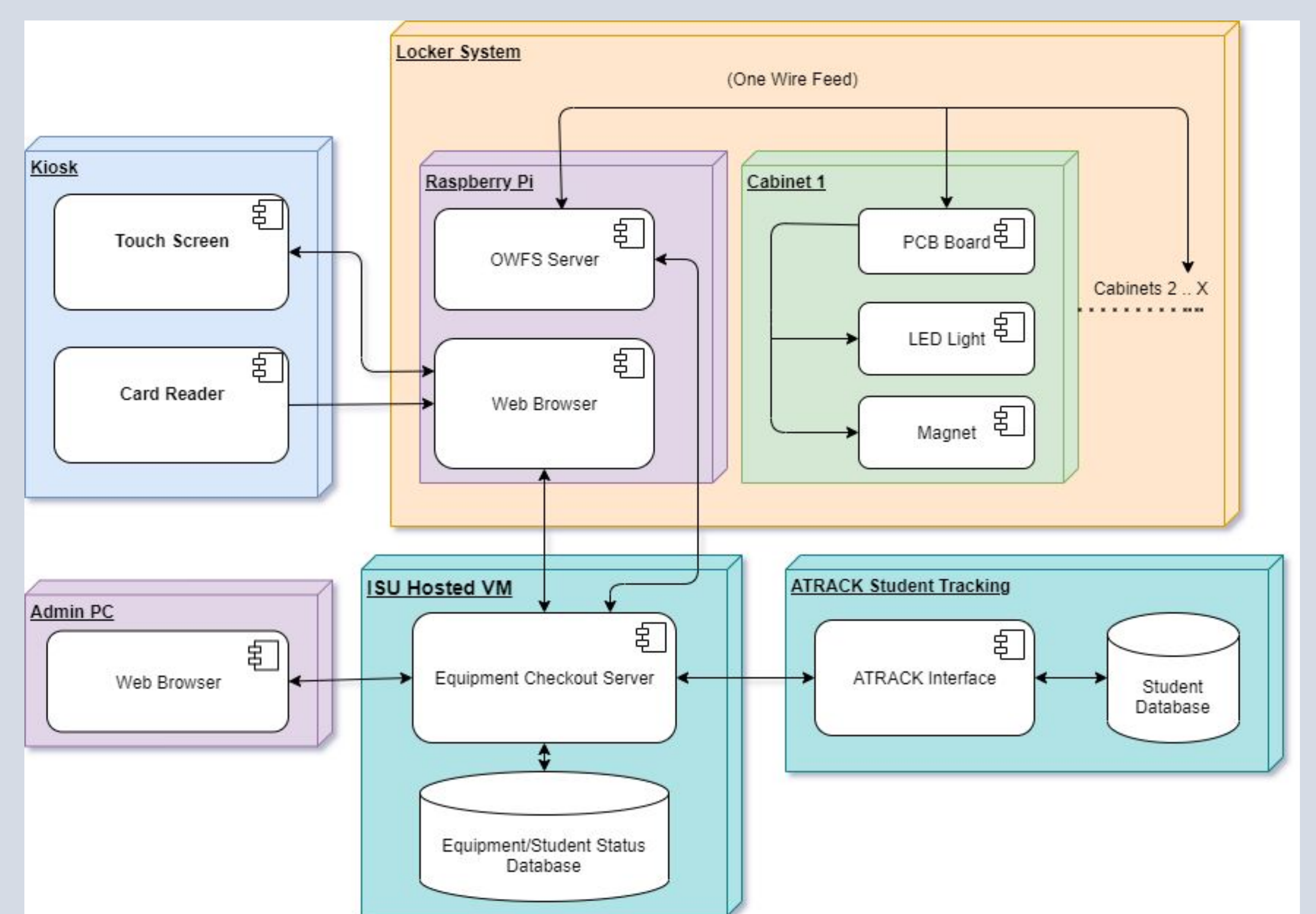## Conceptual Sketch
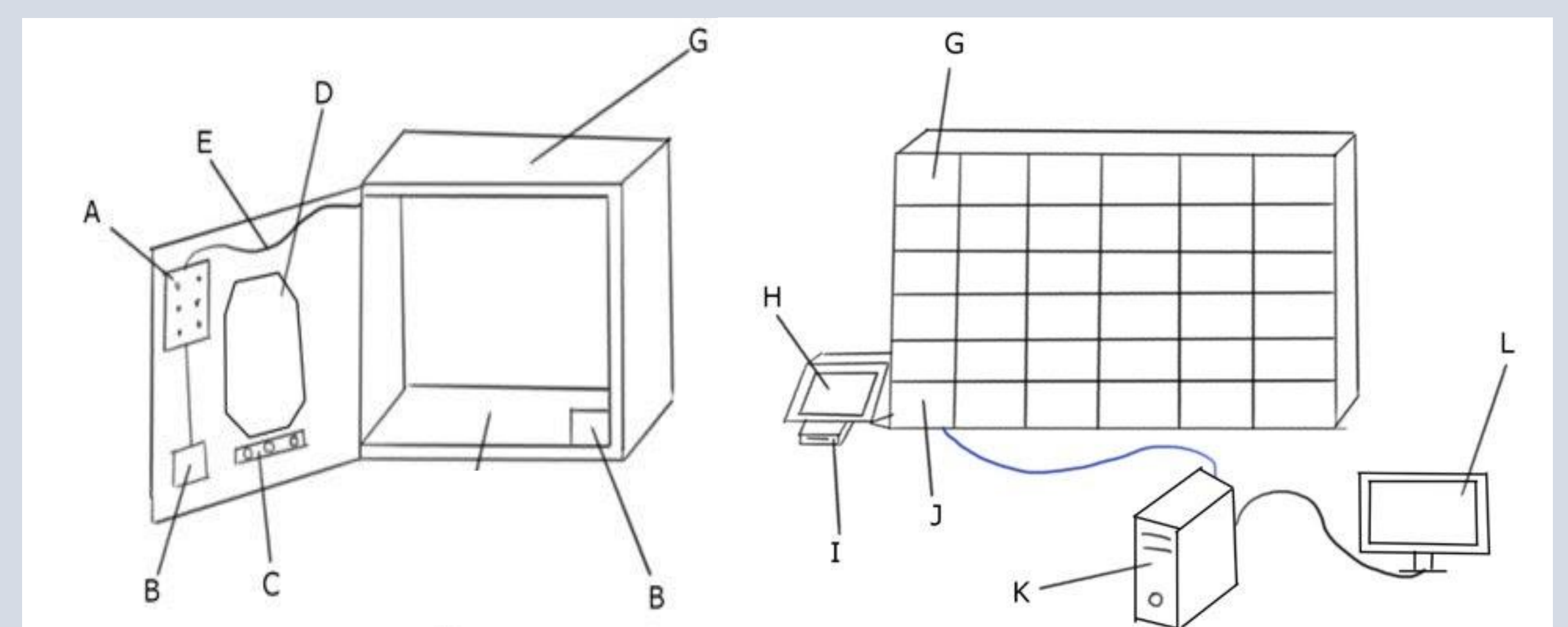
A : ECU
B: Magnet
C: LED Light
D: Window
E: One Wire
G: Cabinet
H: Touch Screen Monitor
I: Card Reader
J: Control Box/Pi
K: Server/VM
L: Admin Desktop

System Diagram

Operating Environment

- Locker should remain indoors
- Locker should endure normal room temperatures
- Locker should be tamper-resistant
- Product should be scalable to have any number of lockers