

PURPOSE

In today's world where both security and convenience are expected, traditional lock-and-key systems fall short. They're easy to misplace, can be stolen or copied, and offer no way to manage access remotely. This becomes a serious limitation for homeowners and businesses who need more flexible, modern solutions.

OUR SOLUTION

Smart Lock replaces outdated systems with a Wi-Fi-enabled locking mechanism. The lock allows users to authenticate using a keypad or mobile app and supports remote locking/unlocking, eliminating the need for physical keys and improving access control across multiple users and devices.

OBJECTIVES

- Remote access:** Lock/unlock from anywhere
- Local keypad authentication:** Input PINs directly to unlock the door
- Secure cloud integration:** Store & validate PINs through server
- Physical actuation:** Control a solenoid lock through microcontroller
- Ease of installation:** All components housed in a 3D-printed enclosure

TARGET USERS

Homeowners: Want easy & secure door access for family members



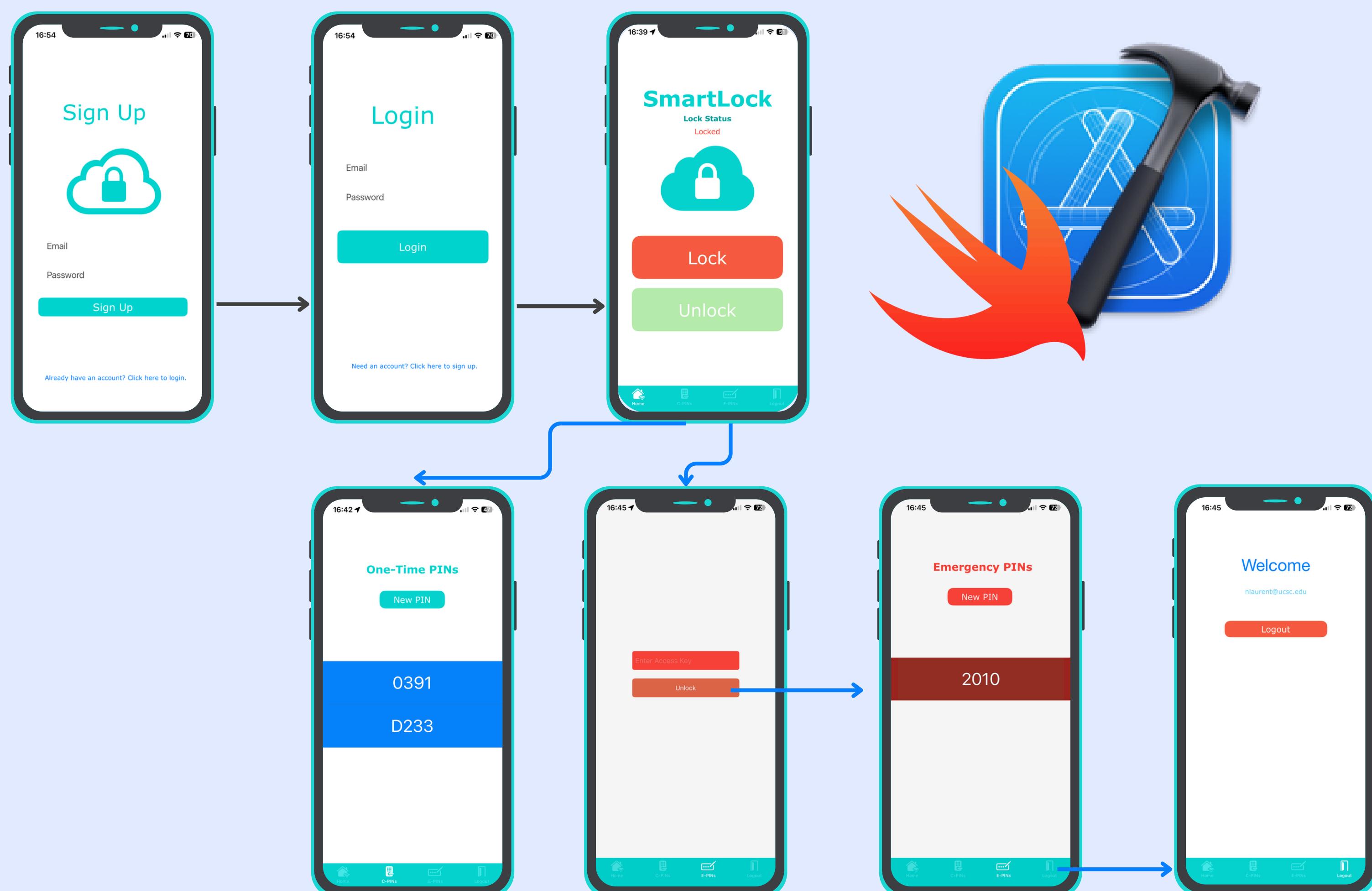
Airbnb Hosts: Provide temporary access to guests remotely without physical key exchanges



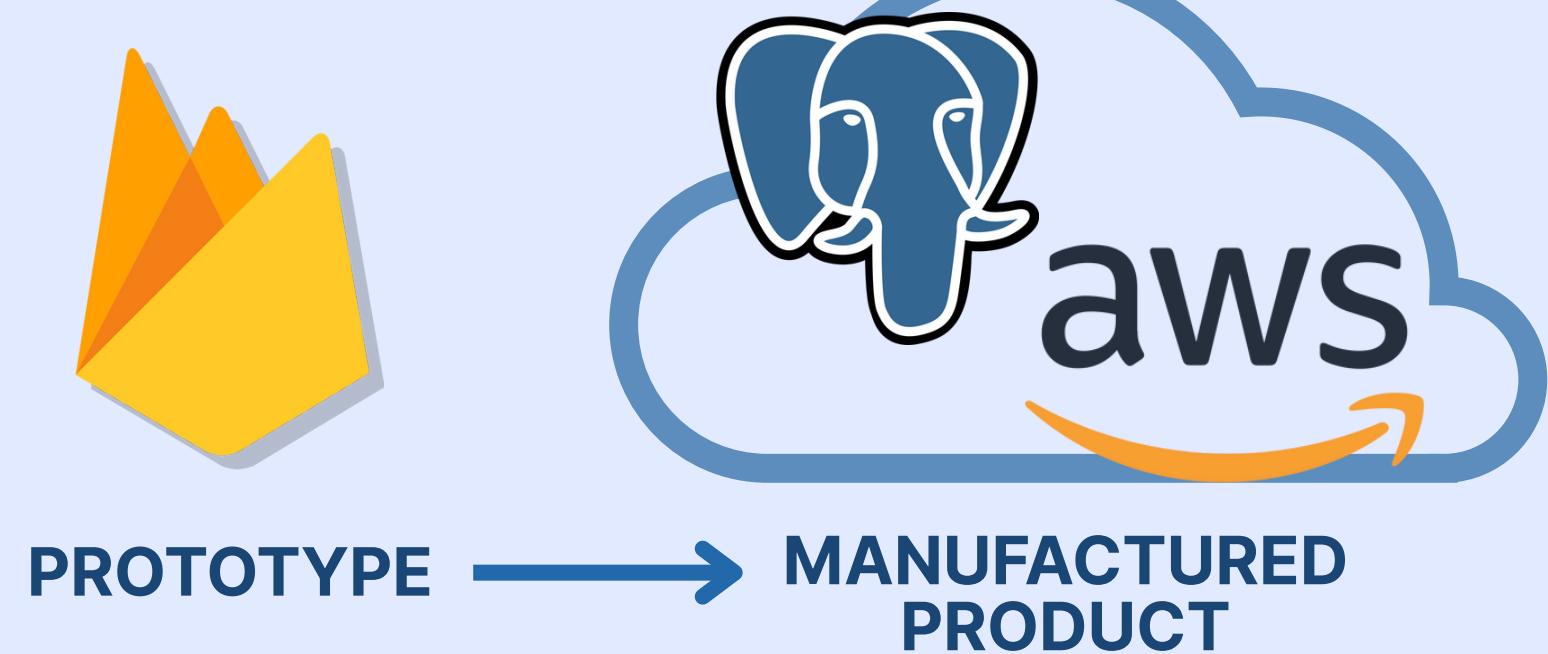
Office Managers: Require controlled access to office premises with the ability to monitor entry logs

SOFTWARE**Mobile app in Swift/Xcode**

Mobile interface for user login, PIN generation, and lock control

**Cloud Infrastructure**

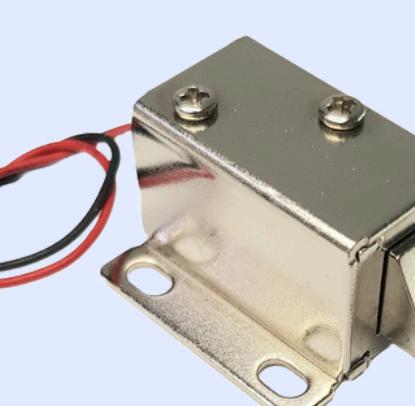
Cloud database for storing PINs, lock state, and user data

**Wifi Manager**

One time initial setup for Wi-Fi connection via local access point

**System Components****ESP32-C3 Microcontroller**

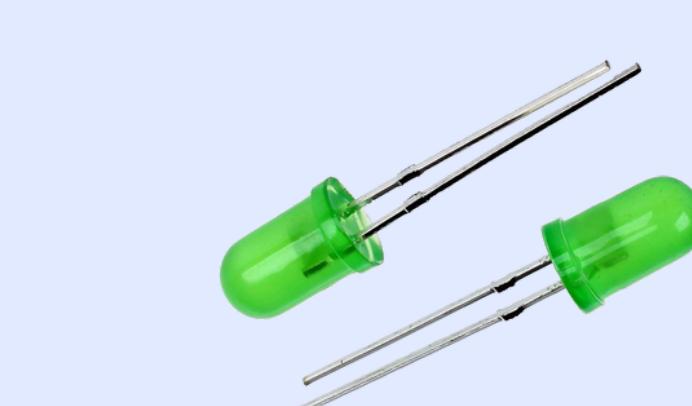
Connects to server, controls the lock. It also interacts with LED, keypad, and the lock

**Solenoid lock**

Actual lock used to lock/unlock the door

**4x4 Matrix Keypad**

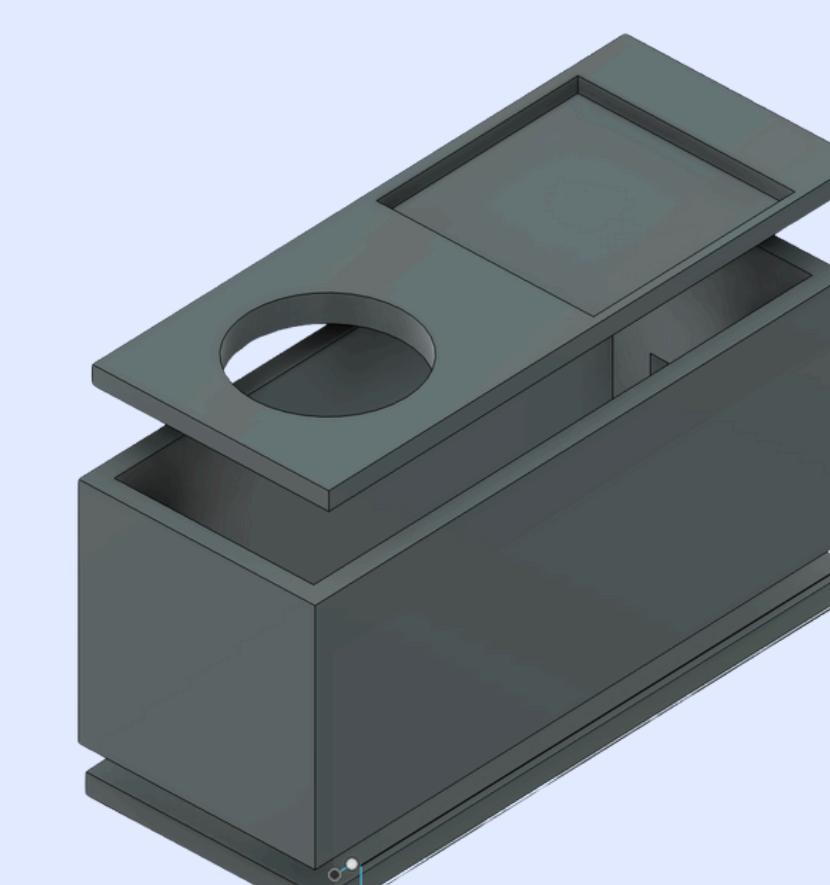
Used to input PINs for local access

**LED lights**

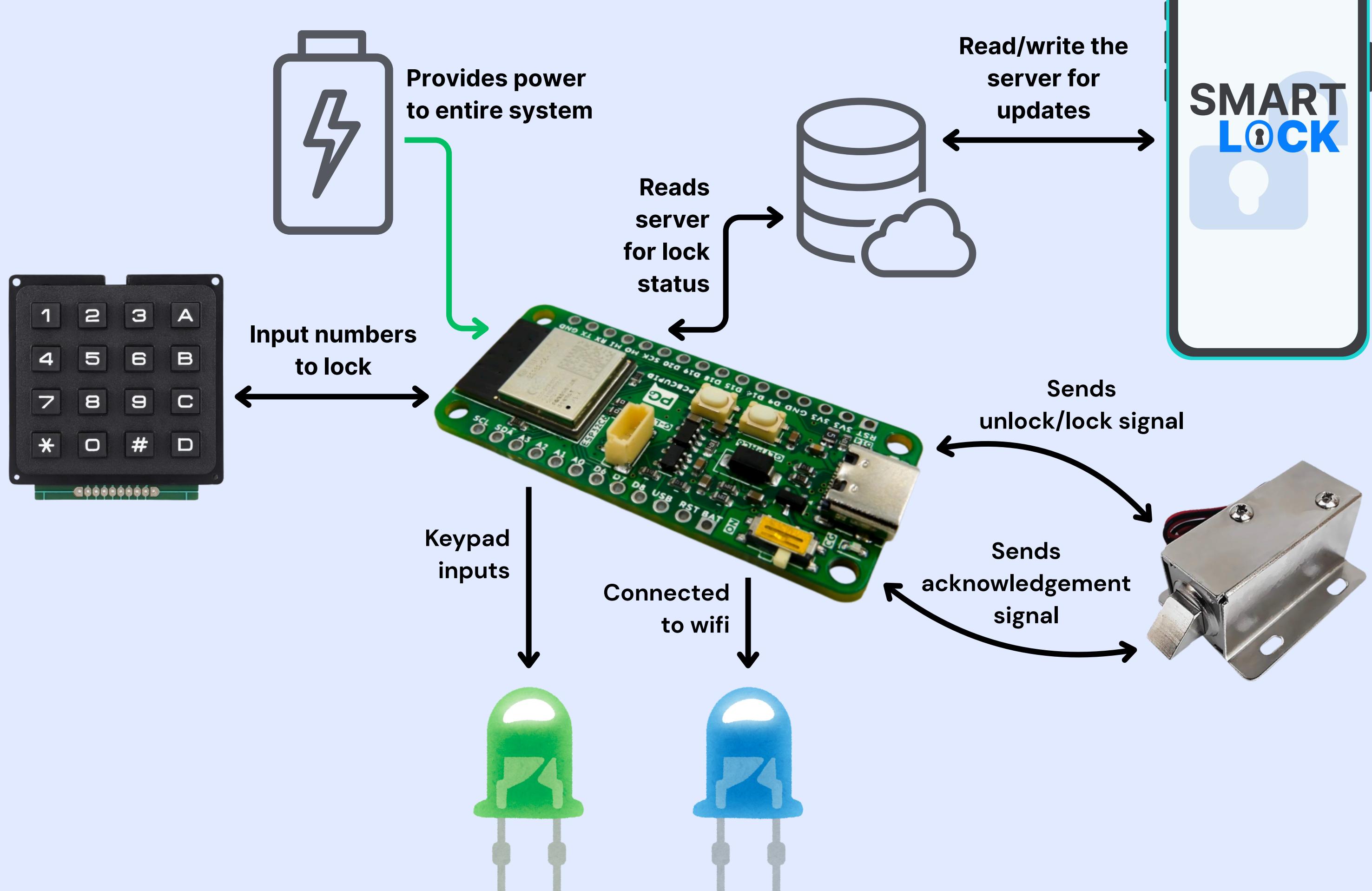
Provides visual feedback for wifi connectivity & door lock status

**12V Rechargeable Battery**

Provides power to the solenoid lock & microcontroller

**3D-Printed Casing**

CAD-modeled enclosure to house all internal components

Design Overview

Scan to view prototype demo:



Contact us at awu74@ucsc.edu

FUNCTIONAL PROTOTYPE