Team 12

Allegion Wireless Programming

Team 12

Team Members: Jason Fornek, John Bock, Kara McCarthy, Asad Lalani, Alex Kolkman, Adam Rudy

Mentor: Joseph Fraseur

Customer Background

Allegion is a pioneer in the safety industry as they are known to have created the first-ever electric-controlled lock. They have a long history of expertise in creating security products for both the commercial and residential industry. Allegion has sponsored capstone projects for the Purdue Polytechnic Institute for several years.

Problem Statement / Scope of Work

Our team used a new approach to alter the process of adding and deleting codes to the Schlage Touch dead-bolt lock. Beforehand, the user would follow paper instructions to program the lock, prone to user error and loss of physical instructions. Our team's goal was to create a wireless system which allows the user to add/delete codes in a timely, efficient manner resulting in a better user experience.

Requirements

Requirements for the wireless programming system include:

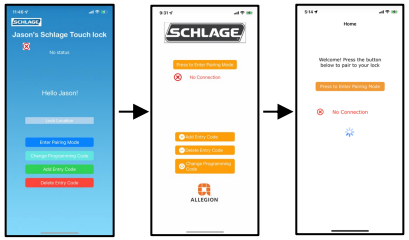
- No download or login required
- Develop an application to manage entry codes
- Use a Bluetooth Low Energy (BLE) module
- Low power and battery consumption
- Send/Receive data from Schlage Touch Lock
- BLE module must connect to lock within 15 seconds and 30 feet

Experimentation and Concepts

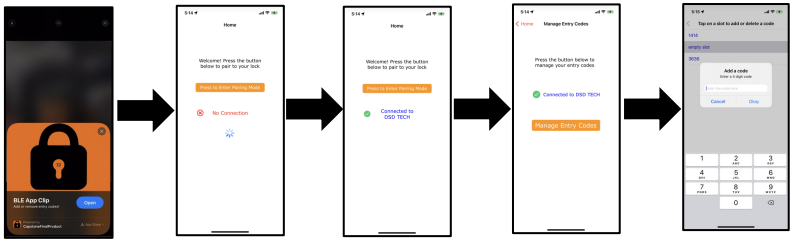
Weighted Score						
	Criteria	iOS	Android	Web		The weighted score multiplies the Utility function score by the weighting factors to determine the best solution, which is highlighted in GREEN.
1	Target Products	0.01	0.00	0.02		
2	Developing Platform	0.07	0.00	0.11		
3	Cost of Developing ($)	0.02	0.00	0.02		
4	Ease of Access to User	0.00	0.00	0.25		
5	Security	0.20	0.10	0.00		
6	User Experience	0.40	0.00	0.20		
	Totals	0.70	0.10	0.60		

The team used a down selection process to determine whether an IOS app clip, Android Instant app, or web-based app would best fit the application portion of the project. An IOS App Clip was determined to be the best choice as it was our client's preference and met all criteria.

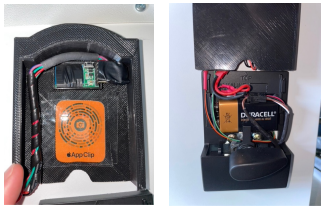
The app clip images below show the development of the homepage Interface over the course of the project.



Final Design



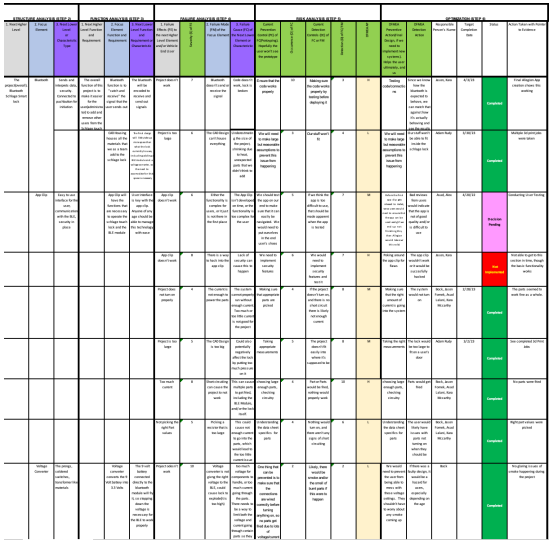
App Clip Interface



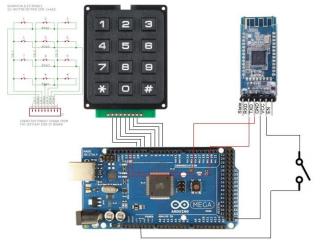
Lock Back Cover (faces indoors)

Schlage Touch Lock (with cover on)

FMEA



Testing



The team designed the circuit above to simulate the connection between the BLE module and the lock for testing. With this system we were able to test transferring and receiving data between devices, and application functionality .