CMPE123 Senior Design Project: Test Document

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*Thanks to Professor Anujan Varma and teaching assistants Sargis Yonan for their guidance during this project

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1 Test Plan

The Lock Management System can be broken down into 2 distinct parts. The microcontroller and the Server. The tests laid out below will test each part individually to ensure that they work as intended before testing the functionality of them working together.

2 Test Scenario

2.1 Microcontroller & NFC Sensor

Test the capability of the micro to read from the NFC Sensor and distinguish between different users.

2.2 Server

Tests the Servers capabilities of handling hundreds/thousands of random login and logout request.

2.3 Microcontroller & Server

A combination of both test, this test ensures that the micro can read and differentiate between different users and while also asking the server for login permission and waits for a response.

3 Test Case

3.1 Microcontroller & NFC Sensor

In this test we assume that each micro represents one room and that only one user will try to gain access to the room at a time. The micro will print out the cruzID for each scan which must match the cruzID for the phone.

- Test sensor with different IDs and make sure the sensor can differentiate

3.2 Server

3.2.1 Users

From a list of 200 first names and 200 last names, CreateListStudents() will return a Python list of n random users, choosing a random first name and a random last name. Additionally, an unique cruzID will be created for each user. This is used for creating a population of users similar to that of the current BSOE system. The number of users is typically on the order of hundreds or thousands.

3.2.2 Rooms and Classes

To simulate logging in, logging out, and population flow for each room, CreateListOfRooms() is used to create a list of n rooms. The rooms will randomly be chosen to be prefixed with either “E2-” or “BE”, standing for Engineering 2 or Baskin Engineering, followed by a

random number from 1 to 599. This simulates random rooms. The number of rooms is typically on the order of tens or hundreds.

In a similar manner to how rooms were created, classes are randomly assigned a prefix "AMS", "CMPE", "CMPS", or "EE" for the applied math, computer engineering, computer science, and electrical engineering departments respectively. The prefix will be followed by a number from 1 to 300, which stands for the course number. The number of classes is typically on the order of tens or hundreds.

3.2.3 Assigning Rooms and Classes

To simulate the real time application, each room entity (see Project Document), will be assigned anywhere from 0 to 3 classes. The real world analagous parallel would be 3 different classes that have access to one room. Similarly, each user is randomly assigned to be enrolled in anywhere from 2 to 5 classes, which is a realistic representation of current students.

3.2.4 Simulation

The main() function will allow the user to specify the number of simulations to attempt. A random student is picked and then a random room is selected for the student to log in or log out. This happens n times. With large enough samples, users may log in and log out of a room multiple times, users may attempt to log into rooms they don't have access to, and users may attempt to log into a room while "in another room".

The simulation will tabulate the theoretical population of each room and the location of each user. After the simulation, the data will be pulled from the datastore and compared with that of the program.

- Logging into room user has access to
- Logging into room user does not have access to
- Logging into room while user is "in" another room

3.3 Microcontroller & Server

This test assumes is that each user will logout before they login the another room. Multiple micros will be setup as different rooms and different phones to be different users. The test will be a success if each micro can different different users and waits for the server response. If the server responds with a yes the micro will turn on a green light and red not allowed in room.

- (TEST 1) Log into room with correct ID and confirm they are allowed in
- (TEST 2) Log into room with incorrect ID and confirm they aren't allowed in