ECE 153B Final Project Proposal https://sites.google.com/view/ece-153b-abel/
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Access Control Door Lock Project

Overview:

This project proposal is for a STM32L476 based Radio Frequency Identification (RFID) door lock. In this project I will use MIFARE protocol and the MFRC522 RFID reader. The reader operates at a 13.56 MHz frequency, and the distance is up to 10 cm depending on how the RFID reader is installed. The RFID reader module uses SPI protocol to communicate with our microcontroller. I will use a proximity sensor which will check whether the door is open or closed, and a servo motor to lock or unlock the door. An external LCD will be used to constantly display the current status of the lock. It will make viewing of status easier if I do not use the display on the microcontroller.

Peripherals:

1. MFRC522 RFID Module
2. Servo Motor
3. Proximity Sensor CNY70
4. External LCD Display
5. UART Fingerprint Reader STM32 (Further implementation)

Protocols:
1. SPI
2. MIFARE protocol
3. UART-TTL

Software Design
The main setup for the project will be to have one key that servers as administrator. Unless we have scanned this tag, the door stays locked and LCD will display an initial message to indicate the state. Once a signal is received the program will check if it's the admin, if so it will unlock and enter an authentication mode where new ID's can be entered to the data of authorized users, or removed if they already exists. The proximity sensor will always check the status of the door and send interrupt signal with the highest priority to lock if it is in a distance which is considered closed.

Goals
Short Term
The initial phase of the project will be communicating and getting the RFID sensor to work. To setup the keys, be able to add and remove users.
Mid-Phase
Build the setup for the door and imply the servo motor to the lock mechanism.
Final Goal
A working door lock that can be unlocked by a recognized user or admin key card which responds to the reading from the RFID.
Final Stretch Goals
Add a finger print implementation to control access.