Final Project Proposal

Year: 2025 Semester: Spring Team: 20 Project: Encrypted USB Drive

Creation Date: ­1/15/2025 Last Modified: 1/18/2025

Team Members (#1 is Team Leader):

Member 1: Abhijay Achukola Email: aachukol@purdue.edu

Member 2: Brandon Liu Email: liu3394@purdue.edu

Member 3: Stanley So Email: sos@purdue.edu

Member 4: Joshua Wai Email: waij@purdue.edu

1.0 Project Functional Description:

We plan to make an encrypted thumb drive. There will be a fixed number of 4 users. There will be an onboard LCD screen, a keypad, and a fingerprint sensor.

Initially on hardware reset, all the users’ passwords are 4 0s. When we plug in the thumb drive, the LCD screen will say "Select User" and we have to enter a number on the keypad to select the user (1 for user 1, 2 for user 2, 3 for user 3, and 4 for user 4). Then the LCD screen will show “Enter Passcode” and the screen will display what the user types on the keypad. The keypad input the LCD screen displays will be replaced with a dot as the numbers get typed. Once the user enters the correct passcode or inputs the correct fingerprint, the thumb drive will go into the unlocked state where all the files for that user can be accessed. In the unlocked state, the user can press a button to change the passcode or change the fingerprint. To lock the thumb drive, you unplug it from the computer. If the user enters the wrong password on the keypad 5 or more times, then the data for that user is erased and the password gets reset to all 0s.

2.0 Team Member Expertise and Team Roles and Responsibilities:

2.1 Team Member Expertise:

2.1.1 Team Member: Abhijay Achukola: Embedded Circuit Design, C Programming, SystemVerilog, Leadership, Soldering.

2.1.2 Team Member: Brandon Liu: Python and C Programming (HPE, Garmin), theory of operation & functional design (ECE 362, ECE 337, Garmin)

2.1.3 Team Member: Stanley So: SystemVerilog and Embedded C Programming

2.1.4 Team Member: Joshua Wai: Python and C programming

2.2 Team Roles and Responsibilities:

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| --- | --- |
| Role | Team Member |
| Team Lead | Abhijay Achukola |
| Systems Lead | Brandon Liu |
| Hardware Lead | Stanley So |
| Software Lead | Joshua Wai |

3.0 Homework Assignment Responsibilities

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| --- | --- | --- | --- |
| *Design Component Report* | | *Professional Component Report* | |
| A3-Software Overview | Joshua Wai | A9-Legal Analysis | Joshua Wai |
| A4-Electrical Overview | Stanley So | A10-Reliability and Safety Analysis | Brandon Liu |
| A6-Mechanical Overview | Abhijay Achukola | A11-Ethical/Environmental Analysis | Stanley So |
| A8-Software Formalization | Brandon Liu | A12-User Manual | Abhijay Achukola |

4.0 Estimated Budget

Total - $100

PCB – $20

Sensors/Input - $5

Display - $10

ICs - $45

Microcontroller - $10

Enclosure - $10

5.0 Project Specific Design Requirements

Hardware PSDR:

* Keypad for password and ID settings
* LCD display user input
* Flash memory for data storage

Software PSDR:

* ID verification (both password & fingerprint)
* Allocation of memory based on credentials
* Password display management

6.0 Sources Cited: