**Introduction:**   
We are going to create a device that uses an embedded system with a series of security measure that unlock the safe. We will have a distance measurer to unlock our fingerprint scanner. The fingerprint scanner will be programmed to only unlock with the user’s fingerprint. Additionally, we will use a Touch Screen LCD display to tell the time and date for our user’s convenience. We will use our Arduino programming skills that we acquired in class. We will also use a Servo to control our lock system. We wanted to make something that was both not complicated and useful in today’s society. In today’s digital world, things are being harder to keep safe. That is why we thought a place to keep printed documents or information would be kept safer in a physical box that no one can have access to except the protector.

We are only making a prototype so our materials used would be different if we were to sell it to consumers. Even though some of the materials are not ideal, we feel that this is satisfactory for a two week project.

**Objectives and Specifications:**

* Implement a device that can authenticate a user by their fingerprint
* Use a touch pad to reveal the fingerprint scanner and serve additional purposes for the user
* Use Arduino MEGA
* Use UNO R3 2.8 TFT Touch Screen LCD



**Tasks and Priorities:**

* Determine and order needed parts
* Design a system
* Develop software for the system
  + Fingerprint Scanner Security
  + PIN Authorization w/LCD Touchpad
  + LED lighting based on the input from the user
  + Ultrasonic distance sensors
  + Locking Mechanism
* Build hardware
* Test and debug the final product

**Schedule:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **7/14-7/21** | **F** | **S** | **M** | **T** | **W** | **T** | **F** |
|  | **Task** | **14** | **15** | **17** | **18** | **19** | **20** | **21** |
| **1** | **Determine and order needed parts (Gabe)** | **x** | **x** |  |  |  |  |  |
| **2** | **Design a system (Julian)** |  | **x** | **x** | **x** |  |  |  |
| **3** | **Develop software for Fingerprint Scanner (Eric)** |  |  |  | **x** | **x** |  |  |
| **4** | **Develop Software for Pin Authorization with LCD Touch Pad (Tyler)** |  |  |  |  | **x** | **x** |  |
| **5** | **Develop Software for LED lighting based on the input from the user (Eric)** |  |  |  |  |  | **x** | **x** |
| **6** | **Develop Software for Locking Mechanism (Eric)** |  |  |  |  |  |  | **x** |
| **7** | **Build Hardware (Julian/Tyler)** |  |  |  |  |  |  |  |
| **8** | **Testing/Debugging (Tyler/Julian)** |  |  |  |  |  |  |  |
| **9** | **Final Presentation (Everyone)** |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **7/22-7/27** | **S** | **M** | **T** | **W** | **T** |
|  | **Task** | **22** | **24** | **25** | **26** | **27** |
| **1** | **Determine and order needed parts** |  |  |  |  |  |
| **2** | **Design a system** |  |  |  |  |  |
| **3** | **Develop software for Fingerprint Scanner** |  |  |  |  |  |
| **4** | **Develop Software for Pin Authorization with LCD Touch Pad** |  |  |  |  |  |
| **5** | **Develop Software for LED lighting based on the input from the user** |  |  |  |  |  |
| **6** | **Develop Software for Locking Mechanism** | **x** | **x** |  |  |  |
| **7** | **Build Hardware** |  | **x** | **x** |  |  |
| **8** | **Testing/Debugging** |  |  | **x** | **x** |  |
| **9** | **Final Presentation** |  |  |  |  | **x** |

**Budget:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Qty** | **Part** | **Description** | **Cost** |
| **1** | **Laser Cut Box** | **A box to serve as our safe** | **Acquired** |
| **1** | **Servo** | **Used for controlling the gears that control the lock** | **Acquired** |
| **4** | **LED lights** | **To tell how many digits were entered** | **Acquired** |
| **1** | **Fingerprint Authenticator** | **Used for unlocking the box** | **50.00** |
| **1** | **LCD Touch Screen** | **Used for telling time and revealing the fingerprint scanner** | **Acquired** |
| **1** | **Arduino Mega** | **Used for managing all of the devices** | **Acquired** |
| **1** | **3D printed hinge** | **Used for connected the safe’s door to the rest of the safe** |  |
| **1** | **Metal Rod** | **Used for making the locking mechanism** | **Acquired** |