Initial ideas:

1. NFC/RFID wallet reader to detect cards i.e. ID, credit cards.

The concept of this device is to prevent losing or forgetting cards. The reader would detect the absence of an object with a disposable NFC/RFID tag attached to it and alert the user. The user would be alerted via Bluetooth to a smart phone.

1. Lock box with NES controller for user interface.

Simple concept but were the innovation is the user interface. An NES controller and an LCD will be used as the user interface for unlocking the box. This project will require minimum components with a mix of electrical and mechanic assembly.

1. Door alarm with keypad user interface

This idea was conceived from a real world problem (unwanted fridge visits). The device would detect a fridge door or any being opened. After an event the device would trigger an alarm that could only be disabled by a keypad combination.

1. Self-leveling table.

The concept came while observing the installation of scaffolding on the side of a building on an uneven surface. The idea was to create a small scale device, duplicate the problem and find a solution by building a flat surface with four legs that when placed on the ground will self-adjust the length if the legs in order to create a level working area that can be safely raised and lowered using buttons and constantly ensure a leveled working area. The goal was to use an accelerometer, gyroscope and four motors to find and adjust the level of the working surface.

Decision matrix

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Project | Hardware | Software difficulty | Cost | Coolness | Feasibility due to time | Total |
| 1 | 2 | 1 | 1 | 3 | 1 | 8 |
| 2 | 1 | 3 | 1 | 3 | 3 | 11 |
| 3 | 3 | 1 | 3 | 2 | 2 | 11 |
| 4 | 1 | 1 | 1 | 2 | 1 | 6 |
|  | high# = desirable | low# = undesirable | |  |  |  |

\*The team decided to pursue project 2 (lock box) due to the coolness factor.

Project proposal

**Concept**: Design a lock box that will open through the use of a NES controller and LCD as user interface.

**Implementation**: with the use of the controller as a sensor the user will have a total of 8 buttons to interact with the lock box. To unlock the box the user needs to enter the correct combination using the up, down, right, left, A, and B buttons. The combination will be in a “cheat code” style. If time permits other unlocking mechanisms will be implemented for example: using a puzzle or game. Feedback to the user will be given via a LCD.

**Hardware:** We decided to use the atmega328p microcontroller because we can quickly prototype using the Arduino and easily translate to “bare metal”.

Lock style solenoid will be use as the locking mechanism along with a custom box.

**Software:** We will begin prototyping with the Arduino platform and move to the Atmel Studio IDE. More details on software to be discussed.