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Project Idea: Timed Lock Box

Description

I find this idea interesting when I browse Amazon the product for procrastination people. Where it is the safe timed lock box for phone with timer, self-control lockable storage box for better habit. Help to lock away your phones, cigarettes, Remote control, game controller, etc. It helps you disconnect from your phone and reconnect with friends and family, or even focus on your work or study. I can put my phone inside the box and set a timer, after the timer is over, the box unlocks, and I can take my phone out. for the input, i will have total of 4 buttons where setting the hours, minutes, and seconds and another enter button. (this can be capacitive sensing). inside the microcontroller, I will be able to count down the time. display on the lcd. output will be either lock or unlock.)

Elements

LCD Display

Input

Difficulty: 2/5

This is the main screen for user to look at the timer. Showing the current time left. And current locking status (icons with lock/unlock). I believe Arduino contains a small LCD Display we can utilize with.

tactile switches

Input

Difficulty: 1

This include using the switch to set the time Hour, minutes, and seconds. And include a switch to click enter to submit all inputs to microcontroller.

Timer countdown & switches for user to set time

Processing

Difficulty: 3/5

We will accomplish this part using Arduino raw coding and connect it to LCD display. They have the library called "LiquidCrystal" library to control LCD display. This makes it easier to display content on the LCD via microcontroller. And timer countdown library in Arduino as well, called "TimerOne". This takes 1 difficulty. Setting time itself processed in the microcontroller takes 1/5 difficulty. Additionally, for the strict self-control purpose, emergency will be included where it allows user total of 5 times to emergency unlock their box due to series of reason and this process can takes some effort to implement to make sure when the emergency is run out, the box will be locked forever. User can have a rule reward being distributed where every 30 hours of time spent the timed lock box, 1 additional chance of emergency use is added. The mathematics algorithms take 2 difficulties overall.

Locker

Physical output

The state of locker to be either lock or unlock based on the microcontroller output after processing.

Battery percentage output Indicator

Output display

Since the timed lock box has emergency feature, we need the battery percentage to indicate if the battery is almost run out, else the box in a lock status might fail to work and the user is not able to take the phone out.

Sanity Check Questions

- Does the physics work out?

The physics itself will work out if the locker is working, and not damaged.

- If you use any motors, are they strong enough?

This part does not use any motor, only the locker.

- Can you get a power supply that is powerful enough?

Yes, this case we will use the 9 V battery outside the box.

- If you need to purchase parts, are they inexpensive enough?

Cheap enough via Amazon for the battery percentage indicator and the LCD display.

Project Idea: temperature detector for Coffee Cup

Description

Temperature detector for a coffee cup for the hot drink type of people, they might concern about the timing of when their hot drink meets their favorite temperature preference. This case, we can take input from the temperature detector and an input from the threshold to remind drinking when meet certain degree, process via the microcontroller, keep track of the temperature change until reach the threshold, output the degree of current temperature, and output a sound ("Didi" sound) when meets the threshold degree we want.)

Elements

Waterproof temperature sensor

Input

Difficulty: 1

DS18B20 temperature sensor can be bought from amazon with a bundle and a stainless probe to detect the temperature. Arduino has the library call DHT sensor for the temperature and humidity detection.

Capacitive sensing temperature adjustment

Input

Difficulty: 3

I plan to use the capacitive here allowing user to adjust the temperature based on "long touch" the touchpad. When user doing the long touch, we will increase the temperature and show on the LCD display. Double press the touchpad to indicate our selection of the

current degree. This can be accomplished by using the demo 4/3 we learned but a more advanced way.

LCD display

Processing

Difficulty: 2

The LCD display will be in record of the current temperature of current liquid. And inside the microcontroller, we will awake the temperature sensor several period of time to record the temperature. Once it reach the threshold degree, will activate the buzzer to produce sound.

Piezo Buzzer

Output

Difficulty: 3

To make the output funnier and more meaningful. We will have one long 5 seconds “di” sound when the threshold is meet at the first time. As the time goes by with the reduction of temperature, we produce short “di-di-di” sound to indicate the liquid is below user’s expectation several period time until it reach the lowest threshold set by the user.

Console Output

Sanity Check Questions

- Does the physics work out?

yes

- If you use any motors, are they strong enough?

No motor.

- Can you get a power supply that is powerful enough?

Yes, we will use 9 v battery here since the coffee cup need to be handed by the user. It needs a battery.

- If you need to purchase parts, are they inexpensive enough?

No, only \$5-\$10 for the temperature detector.

Project Idea: Alarm clock that gets harder to turn off every time you snooze it

Description

This is the third option from the file provided. It can takes some sort of capacitive sensing on the alarm, press for the snooze option.

Elements

Pressure sensor

Input

Difficulty: 1

This can be bought from amazon with the weight of 20g to 2 kg detection. We can send the input of the pressure to the microcontroller to detect if it is necessary to activate the snooze function or not. DF9-16 version.

Timer / Alarm

Input

Difficulty: 2

We need to use library to make the alarm inside the microcontroller so that the timer will run accurately.

Microcontroller for the pressure sensor

Processing

Difficulty: 3

Need to keep the record of setting time, and match it with the snooze activation and activate the pressure sensor to set a certain threshold for the increased snooze actions.

LCD display

Output

Difficulty: 2

Displaying the snooze time and pressure level, and current time.

Sanity Check Questions

- Does the physics work out?
 - yes
- If you use any motors, are they strong enough?
 - n/a
- Can you get a power supply that is powerful enough?
 - Yes, using 9 v battery
- If you need to purchase parts, are they inexpensive enough?
 - yes