Final Project: Arduino Strongbox

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Application Design and Development

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Introduction

Our project is a safe or strongbox that works with Arduino components, which has an initial

functionality that is to store precious objects safely. In short, it is not a very complex prototype,

but it turned out to be quite effective, and this is due to the way in which we arranged the Arduino

and its components, as well as the program that was made. The objective of this project is to make

a safe that is easier to use and probably cheaper, since its design is quite good, it works effectively

and it is somewhat simple to make, since the Arduino components allow it to be done easily.
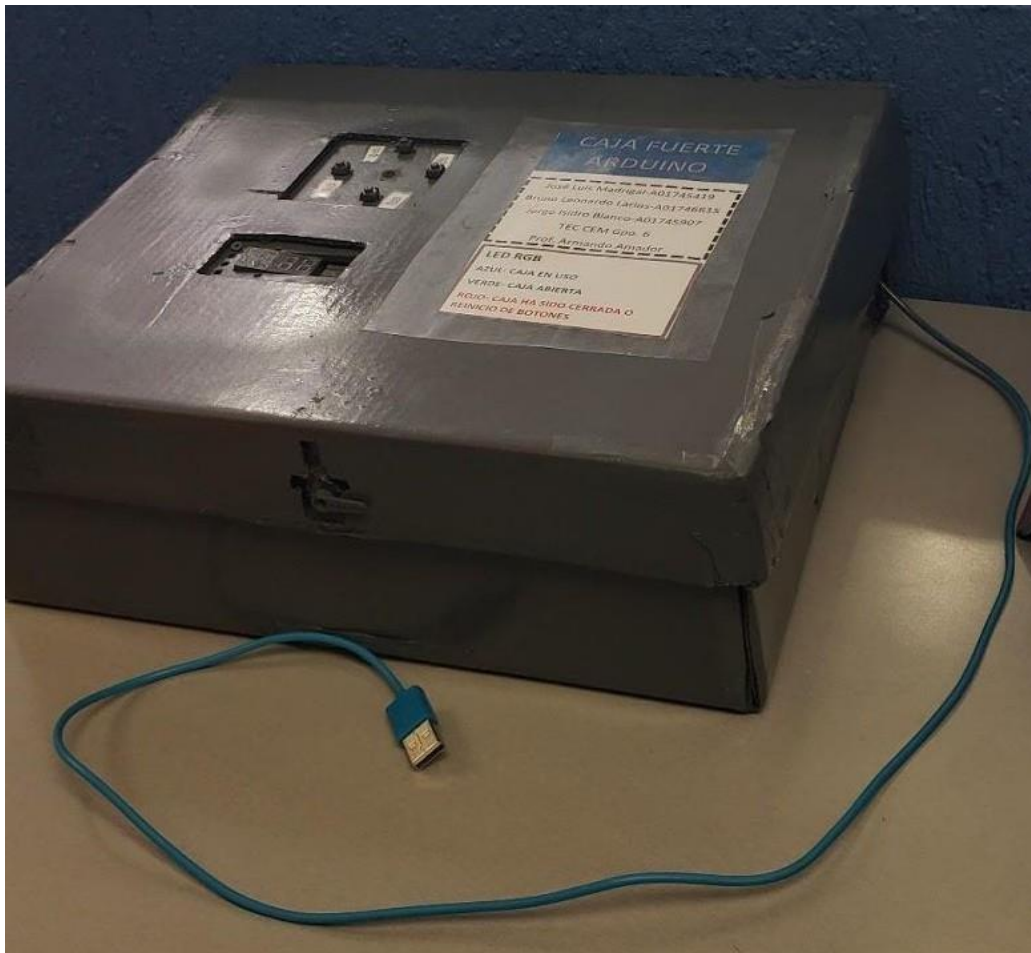
Code

```cpp
//Proyecto Final
//José Luis Madrigal, Bruno Leonardo Larios y Jorge Isidro Blanco
//Caja fuerte
#include <Arduino.h>
#include <TM1637Display.h>
int CLK = A4; // el pin CLK está conectado al pin análogo 1
int DIO = A5; // el pin DIO está conectado al pin análogo 2
#include <Servo.h>
Servo jbj_servo;
TM1637Display display(DIO,CLK);
int jbj_cont1 = 0;
int jbj_cont2 = 0;
int jbj_cont3 = 0;
int jbj_pausa=100;
int jbj_6 = 6;      // led 1
int jbj_7 = 7;     // led 2
int jbj_8 = 8;    // led 3
int jbj_rojo=11;
int jbj_verde = 9;
int jbj_azul = 10;
int jbj_boton1=2;       // boton1 en el pin 2
int jbj_boton2=3;      // boton2 en el pin 3
int jbj_boton3=4;     // boton3 en el pin 4
int jbj_boton4=5;    // boton 4 en el pin 5
int jbj_buzzer= 0; // pin buzzer


void ledjbj_verde () {
  digitalWrite(jbj_verde,HIGH);  // enciendo led verde
```

```cpp
if (digitalRead(jbj_boton3)==LOW){              //se se oprime el botón 3
jbj_cont3 = jbj_cont3 + 1;                      //se aumenta una unidad en el contador 3
display.showNumberDec(jbj_cont3,true,2,2);   //columna posición
}

if (digitalRead(jbj_boton4)==LOW){               //si se oprime el botón 4
jbj_cont1 = 0;
jbj_cont2 = 0;        //contadores se reinician
jbj_cont3 = 0;
display.showNumberDec(jbj_cont1,true,2,2);      //columna posición
digitalWrite(jbj_rojo,HIGH);                    // enciendo led rojo
tone(jbj_buzzer,100);                           // sonido tipo alarma
digitalWrite(jbj_verde,LOW);                    //enciendo led verde
delay (3000);                                   // pausa de 3 segundos
digitalWrite(jbj_rojo,LOW);                     // apago led rojo
noTone(jbj_buzzer);                             // silencia el buzzer
}



if ((jbj_cont1 == 2) and (jbj_cont2 == 5) and (jbj_cont3 == 3)) // contraseña = 2,5,3 - si cada contador tiene su número correspondiente
{
prendejbj_buzer_servo ();
}
else
```

Development

We mainly used the components that could resemble those of a real safe, clearly the buttons were necessary to be able to place the "password", in addition the display was key so that the values of each button could be seen. We also use the RGB led, to be able to indicate certain signals to those who use the box, that is, through the three colors (red, green and blue) we can show the status of the box (closed, open or in use). Another component used was the buzzer, which, like RGB, can indicate the state of the box. Finally, the servomotor performs the function of closing or opening the box, it can be said that it is a kind of snap.

Manual

First of all, we used a shoebox for the project that was bigger than the Arduino one. We place the board and components in the largest box as if it were the original, making the display, buttons and servo visible to the user.

It is worth mentioning that the servo motor was placed in the front part of the box, so that with the help of the propeller it could do the action of a clasp that closes and opens the safe, for this a special hole was also made in the box, so it will work effectively. There are 4 buttons, the first 3 use individual counters, and the last one resets the counters. For the box to open, each counter must have a value specified in the program, for this reason, the

display is used, so that each time a button is pressed its counter can be seen, likewise, button 4 can be used to try again if you make a mistake, as it resets the counters. A condition is set that indicates that when the buttons have their determined values, then the green LED lights up and the servo motor moves to the middle (90º) so that it stops covering the hole made in the box and thus it can be opened, the buzzer also sounds like a cricket. Then, if you want to close the box, press button 4, which will turn on the red led for a few seconds, and will make a sound as an alarm, indicating that the box is about to close, so it moves the servo to its initial position, covering the hole again. Finally, it is important to say that while the buttons do not have their values, the blue led will be on, this to indicate that the box is in use.

Conclusions

First of all, we used a shoebox for the project that was bigger than the Arduino one. We place the board and components in the largest box as if it were the original, making the display, buttons and servo visible to the user. Through this project we were able to learn the possibilities of creating that the Arduino brings and programming in general. In addition, working as a team we understood the importance of designing new prototypes to improve the current problems of society. Likewise, it can be seen that the Arduino is ideal for making new and innovative devices, since it has various components, which allow it to be a fairly complete and effective kit.