Controle de Acesso

Sistemas Reativos - 2016.2

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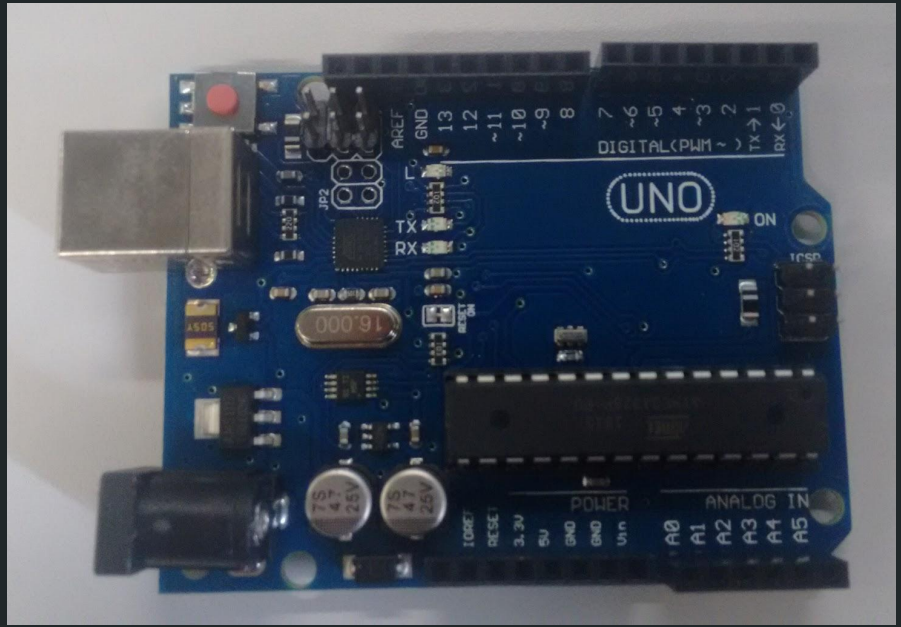
Descrição do Projeto

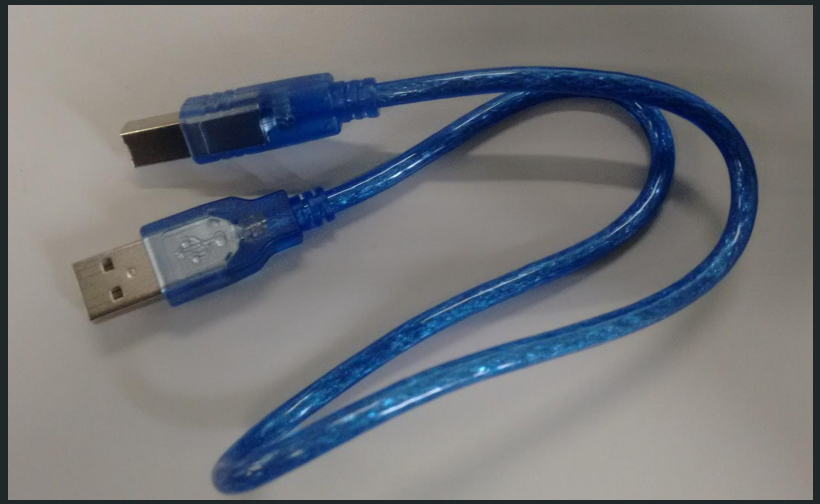
O sistema de controle de acesso consiste em uma trava eletrônica, representada por um micro servo motor, que é destravada quando o usuário digita a senha correta. O sistema conta ainda com sinais sonoros e visuais que indicam ao usuário se a senha digitada está correta ou não.

Materiais Utilizados

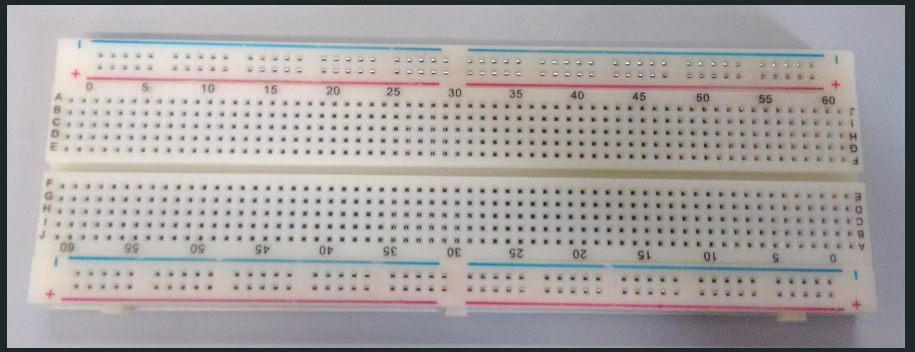
Arduino Uno R3



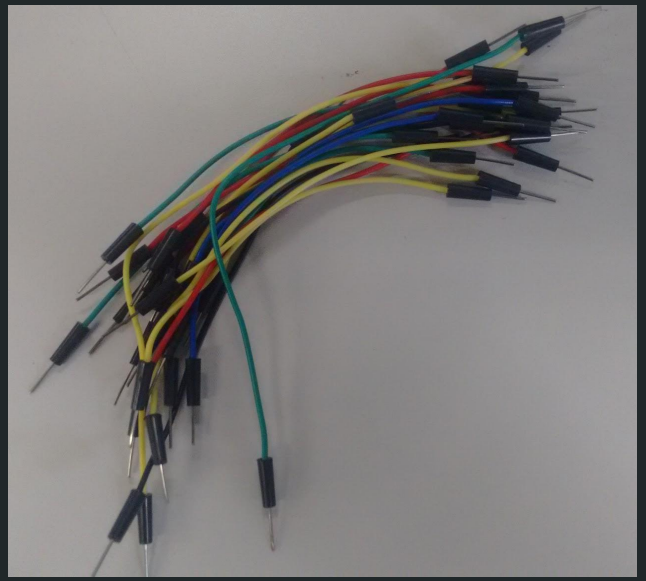
Cabo USB para Arduino



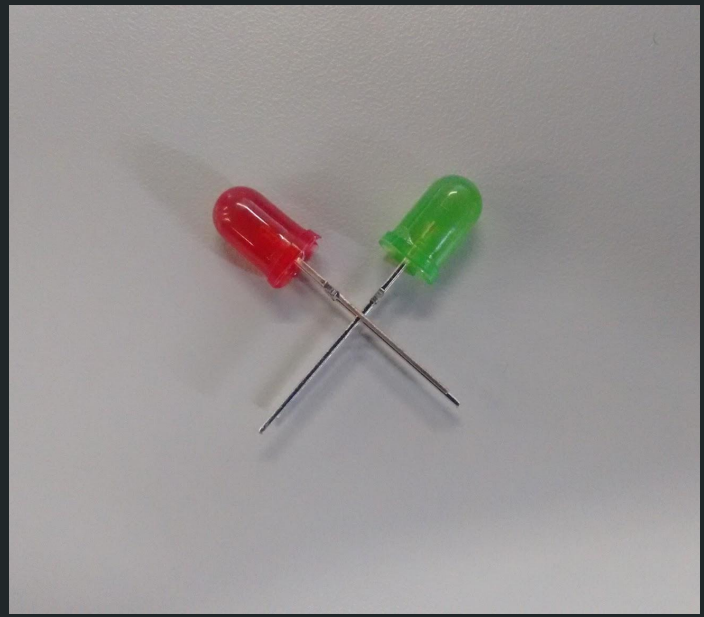
Protoboard 830 pinos



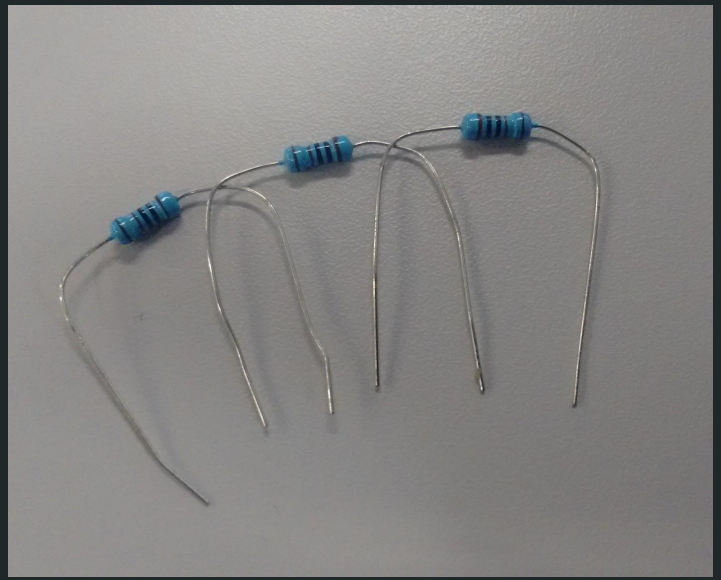
16 jumpers macho-macho



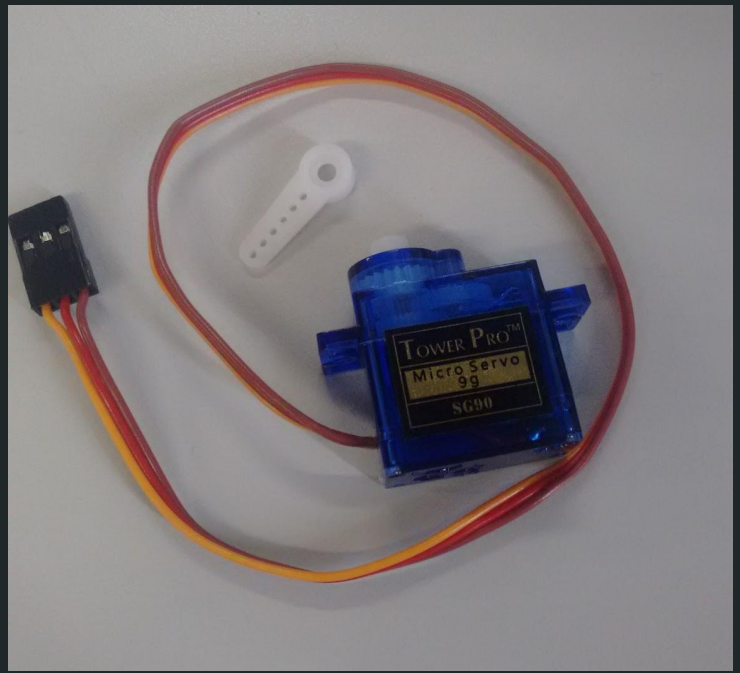
Leds



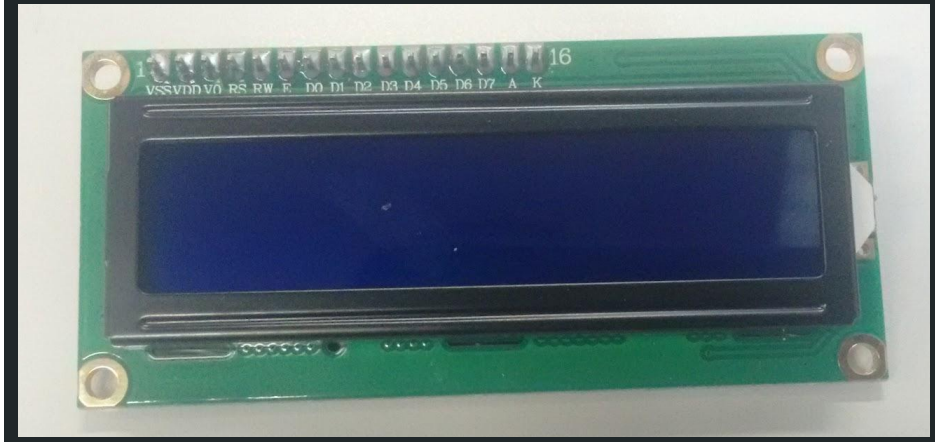
3 Resistores 1KΩ

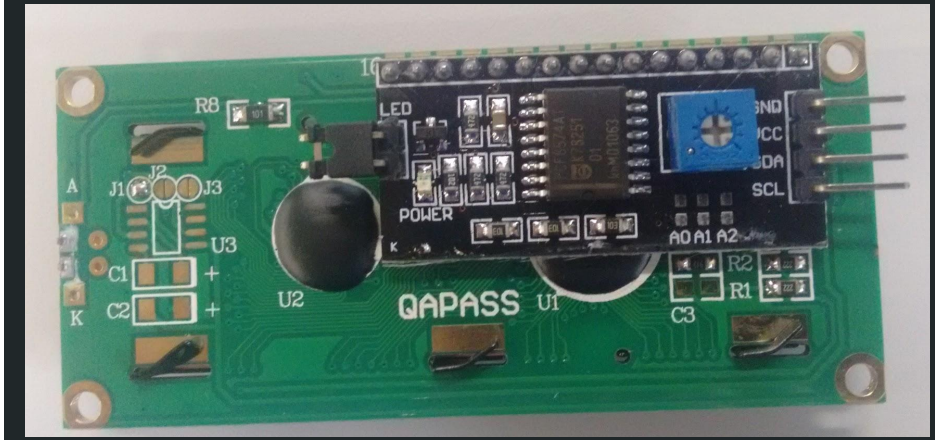


Micro Servo 9g SG90 TowerPro

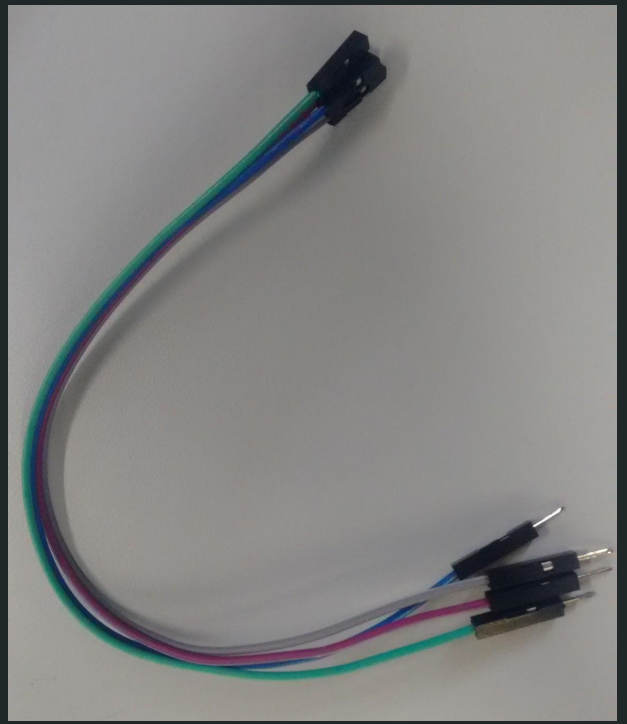


Display LCD 16x2 I2C



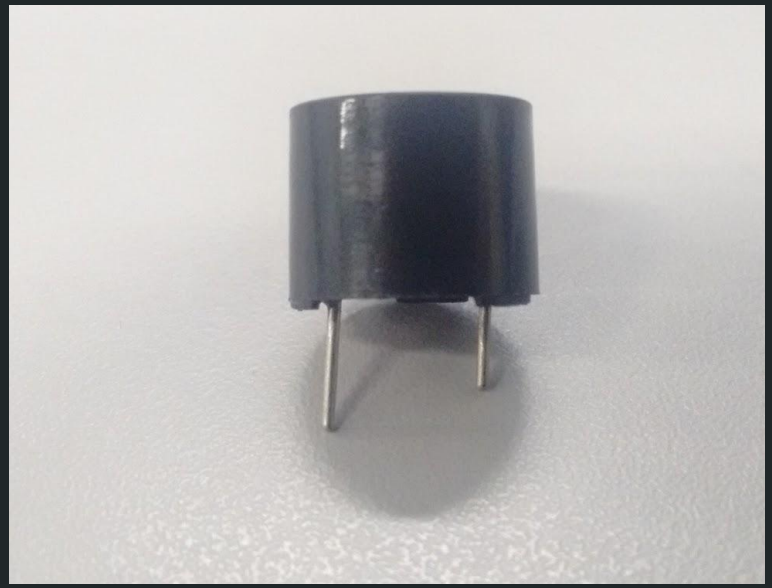


4 Jumpers macho-fêmea

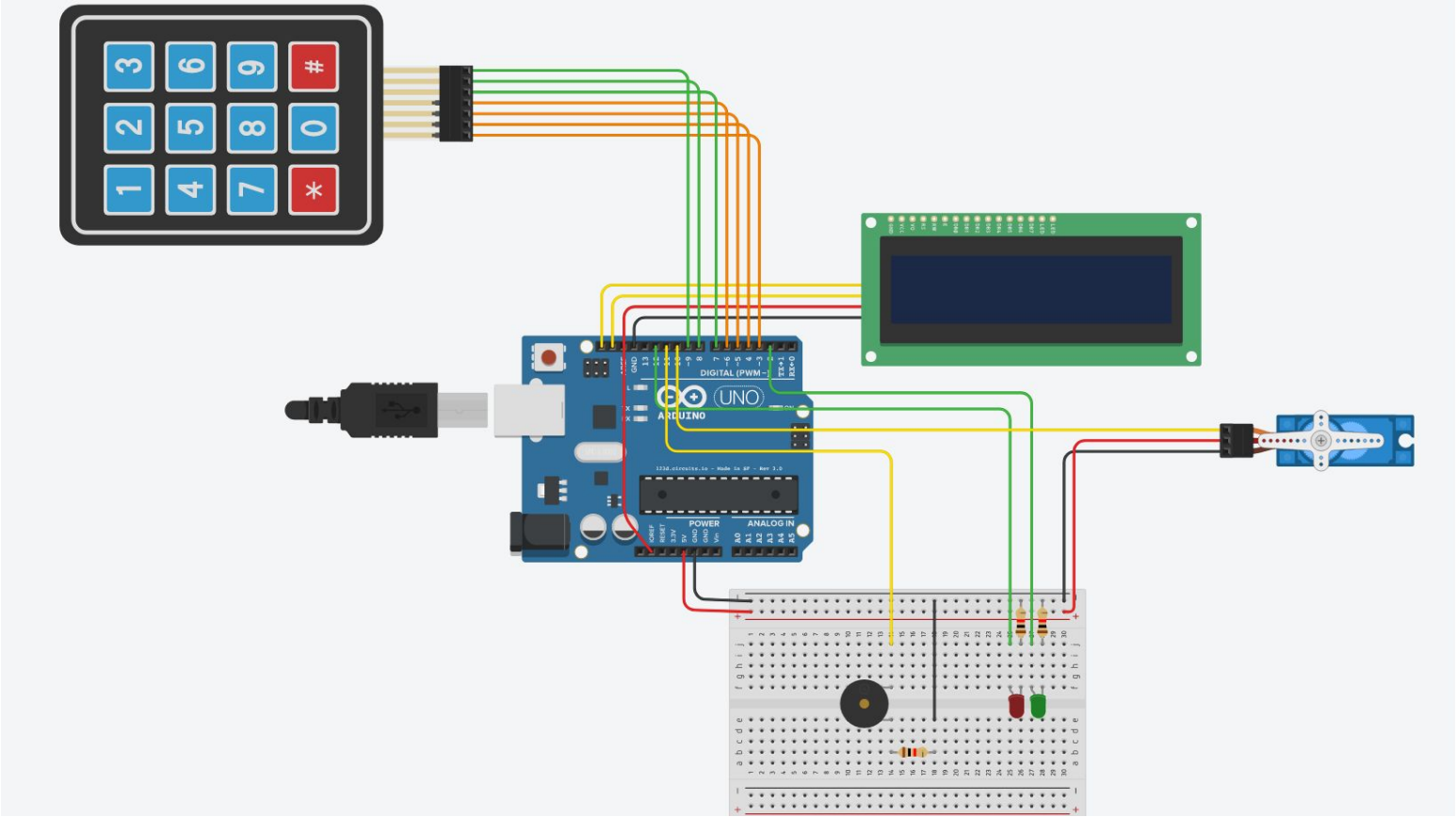


Teclado matricial de membrana

Buzzer



Esquema de Montagem



O Código

Declaração de Variáveis

```
#include <Servo.h>
#include <LiquidCrystal_I2C.h>
#include <Keypad.h>

#define LED_G 2
#define LED_R 12
#define SERVO 10
#define BUZZER 11

char senha[] = "4213";


// Servo
Servo s;
```

```
// Str digitada
char strbuff[200];
bool strdone=0;
int strwr = 0;

int i;

// Tempos
unsigned long t;
unsigned long tuneTime;
unsigned long openTime;
unsigned long msgTime;

// Tranca
bool lock=1;
bool lockpos=1;
```

```
// A-55hz to A-1760hz
int notes[] = {55,58,62,65,69,73,78,82,87,92,98,104,110,117,123,131,139,147,
               156,165,175,185,196,208,220,233,247,262,277,294,311,  330,349,
               370,392,415,440,466,494,523,554,587,622,659,698,740,784,831,
               880,932,988,1047,1109,1175,1245,1319,1397,1480,1568,1661,1760,0};
// Songs
int tones[2][6] = {
  {27,34,41,36,38,0}, // Fail
  {22,28,31,32,33,0}  // Success
};
int duration[2][6] = {
  {300,300,300,300,500,0}, // Fail
  {300,300,150,300,300,0}  // Success
};
```

setup()

```
void setup() {
  pinMode(LED_G,OUTPUT);
  pinMode(LED_R,OUTPUT);
  s.attach(SERVO);
  s.write(0); // Inicia motor na posição zero

  lcd.begin();
  lcd.backlight();

  updlcd=1;
  lcdcurstate=0;
  lcdnewstate=1;
  msgTime=millis()+2000;

  Serial.begin(9600);
}
```

Teclado

```
// keypad
const byte rows = 4;
const byte cols = 3;
byte rowPins[rows] = {3, 4, 5, 6};
byte colPins[cols] = {7, 8, 9};
char keys[rows][cols] = {
  {'1','2','3'},
  {'4','5','6'},
  {'7','8','9'},
  {'*','0','#'}
};
Keypad keypad = Keypad(makeKeymap(keys), rowPins, colPins, rows, cols);
```

```
// Keypad Logic
char key = keypad.getKey();
if(key!=0){
  if(key=='#'){ //enter
    strdone=1;
  }else if(key == '*'){// cancel
    clearStr();
    updlcd=1;
  }else{
    strbuff[strwr++] = key;
    updlcd=1;lcdnewstate=2;msgTime=t-1;
    Serial.println("pressed a key");
  }
  if(strwr>=200){// too many numbers
    clearStr();
  }
}
```

Trava

```
// Lock Logic
if(strdone){// string is done
  if(!strcmp(senha, strbuff)){// senha certa
    lock = 0;
    startSong(1);
    lcdnewstate=4;
  }else{ // senha errada
    lock = 1;
    startSong(0);
    lcdnewstate=3;
  }
  msgTime=t-1;
  clearStr();
  strdone=0;
}
```

```
if(lock==0 && lockpos==1){// time to open
  s.write(180);
  openTime=t;
  lockpos=0;
}
if(lock==1 && lockpos==0){// time to close
  s.write(0);
  lockpos=1;
}
if(lock==0 && t>openTime+5000){// open for too long
  lock=1;
}
```

```
// Led Logic
if(lock){
  digitalWrite(LED_R, HIGH);
  digitalWrite(LED_G, LOW);
}else{
  digitalWrite(LED_R, LOW);
  digitalWrite(LED_G, HIGH);
}
```

Display

```
// LCD
LiquidCrystal_I2C lcd(0x3F, 16, 2);
int lcdcurstate;
int lcdnewstate;
bool updlcd;


// LCD Logic
if(t>msgTime&&lcdnewstate!=lcdcurstate){
  lcdcurstate=lcdnewstate;
  updlcd=1;
}
if(updlcd){
  switch(lcdcurstate){
    case 0:
      lcd.setCursor(0,0);
      lcd.print("   Controle de  ");
      lcd.setCursor(0,1);
      lcd.print("   Acesso  :)   ");
      break;
case 1:
  lcd.setCursor(0,1);
  lcd.print("   Acesso  ;)   ");
  lcdnewstate = 0;msgTime=t+500;
  break;
case 2:
  lcd.setCursor(0,0);
  lcd.print("Digite a Senha: ");
  lcd.setCursor(0,1);
  for(i=0;i<16;i++){
    if(i<strlen(strbuff))
      lcd.print("*");
    else
      lcd.print(" ");
  }
  break;
      case 3:
        lcd.setCursor(0, 0);
        lcd.print("Senha Incorreta ");
        lcd.setCursor(0, 1);
        lcd.print("                ");
        lcdnewstate = 2;msgTime=t+5000;
        break;
      case 4:
        lcd.setCursor(0, 0);
        lcd.print("Senha Correta   ");
        lcd.setCursor(0, 1);
        lcd.print("Seja bem vindo! ");
        lcdnewstate = 2;msgTime=t+5000;
        break;
    }
    updlcd=0;
  }
}
```

Buzzer

```
int tcursor=0;// escolhe a nota/duracao
int scursor=0;// escolhe a musica
bool isplay=0;// se esta tocando


// Tune Logic
if(isplay && tuneTime<t){
  tone(BUZZER,notes[tones[tcursor][scursor]]);
  tuneTime = t+duration[tcursor][scursor];

  if(tones[tcursor][scursor]==0){
    noTone(BUZZER);
  }
  if(duration[tcursor][scursor]==0){
    scursor=0;
    isplay=0;
    noTone(BUZZER);
  }else{
    scursor++;
  }
}
```

Links

Manual e Código Fonte: Github

https://github.com/camila-cg/reativos/tree/master/MiniProjeto_Arduino
https://github.com/Renato95/reativos/tree/master/MiniProjeto_Arduino

Vídeo de Execução: Youtube

https://www.youtube.com/watch?v=Sof8esEVI5o