西安电子科技大学

Ａ 级 达 标 线 上 测 试 报 告

学院 ___微电子学院___ **专业** ___微电子科学与工程___

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手机 ___17519137174___ **完成日期** ___2022-11-13___

成绩 _____

一、题目要求

题目：电子密码锁仿真系统

软件环境：推荐采用Protues8.9SP2 及以上仿真软件，ArduinoIDE。
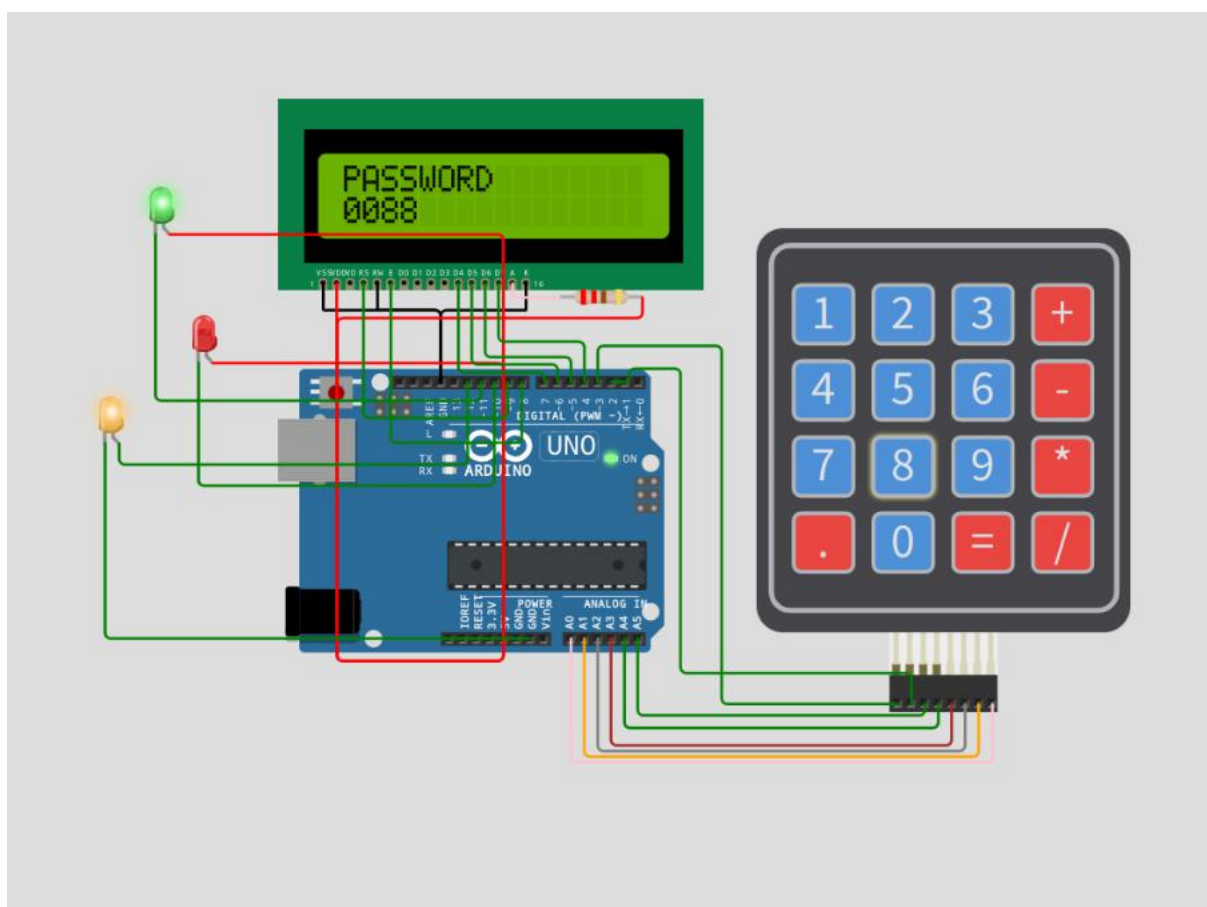
实现功能：使用ArduinoUNO 微控制器，搭建一个简易电子密码锁系统。
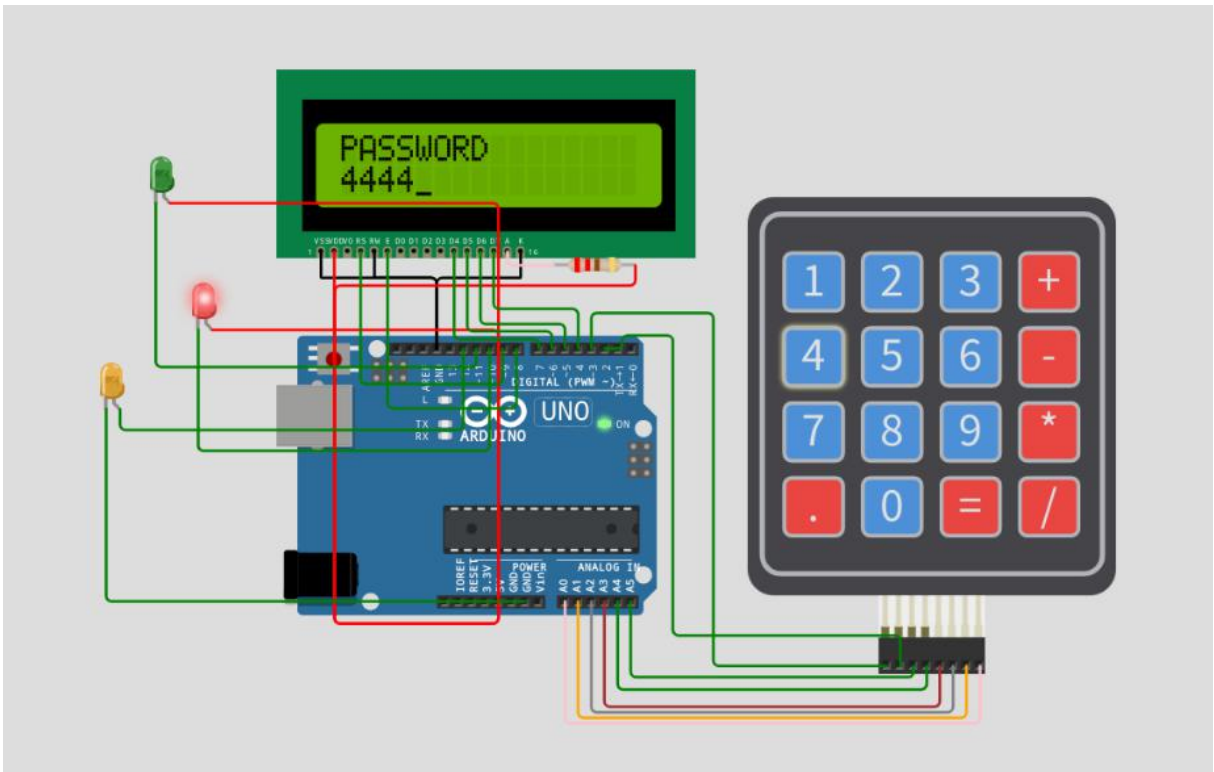
二、设计思路

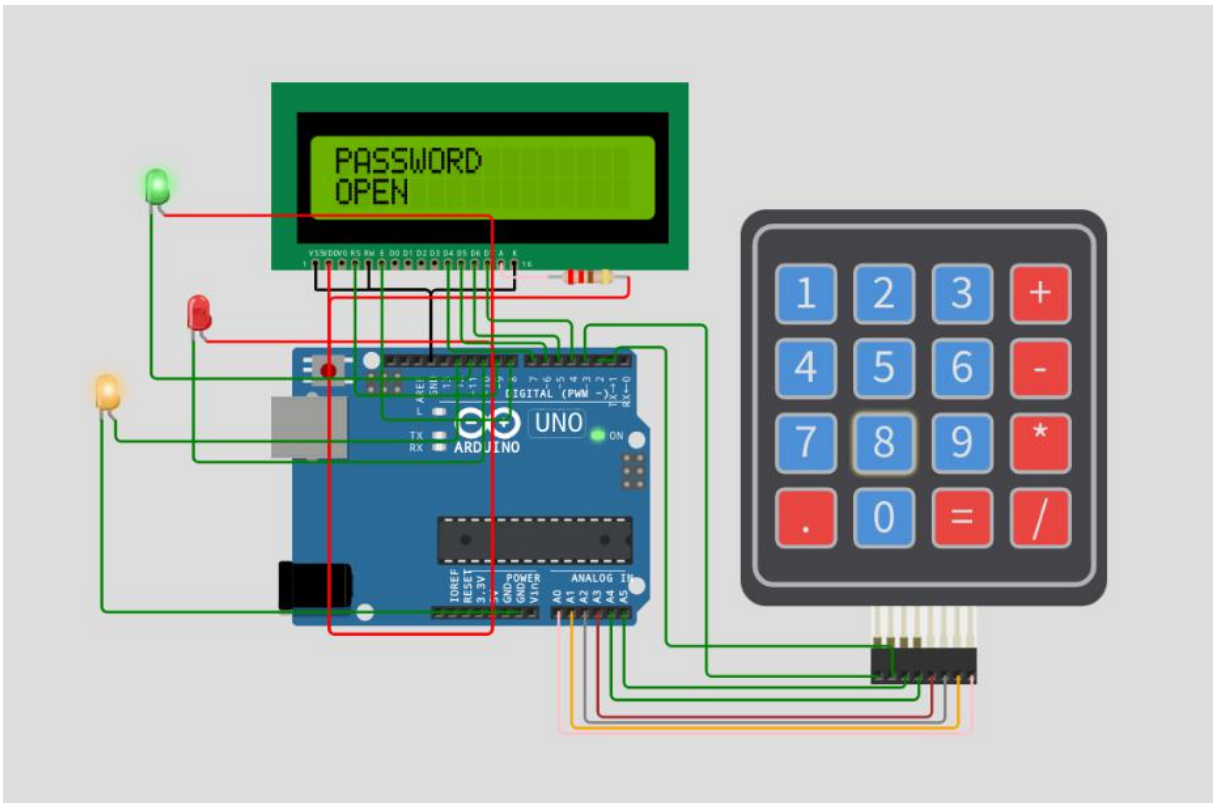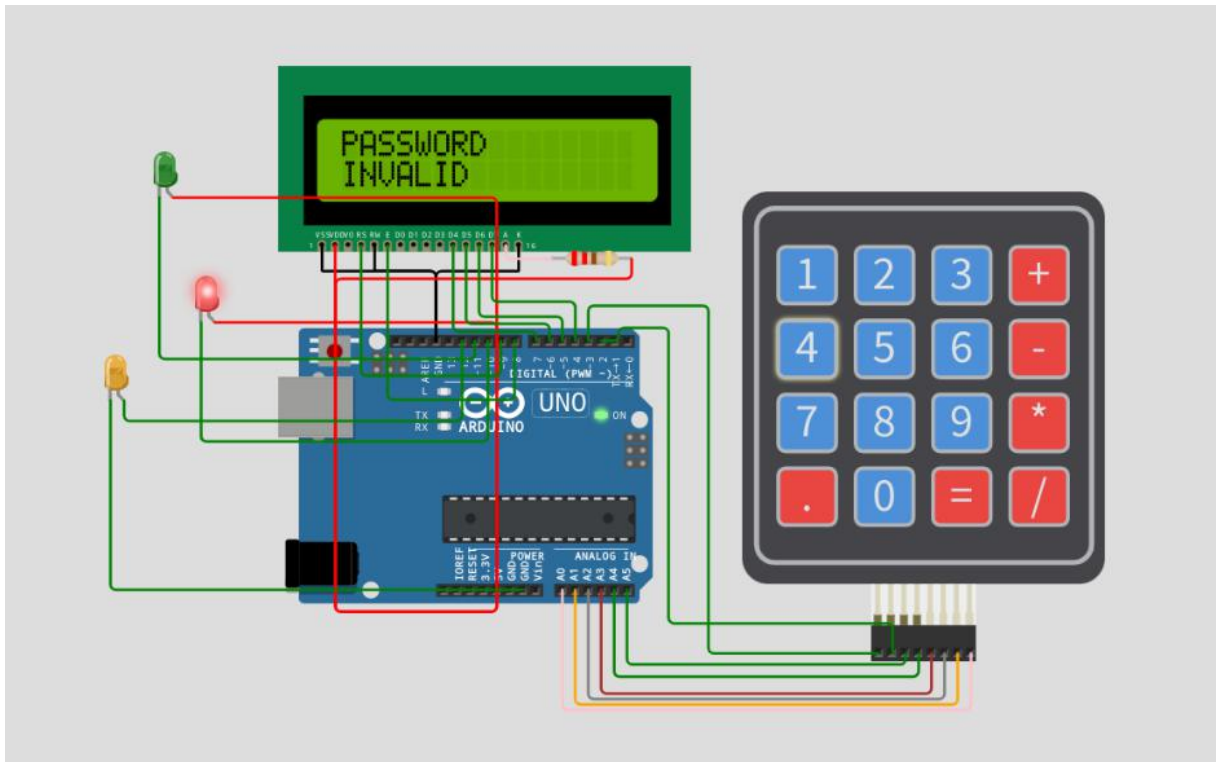功能通过键盘输入密码，LCD 上显示输入密码，ArduinoUNO（Atmega328P）判断密码是否正确。如果密码正确，LCD 上显示开锁成功，绿灯亮，连接继电器的黄灯亮。如果密码错误，LCD 上显示开锁失败，红灯亮，连接继电器的黄灯灭

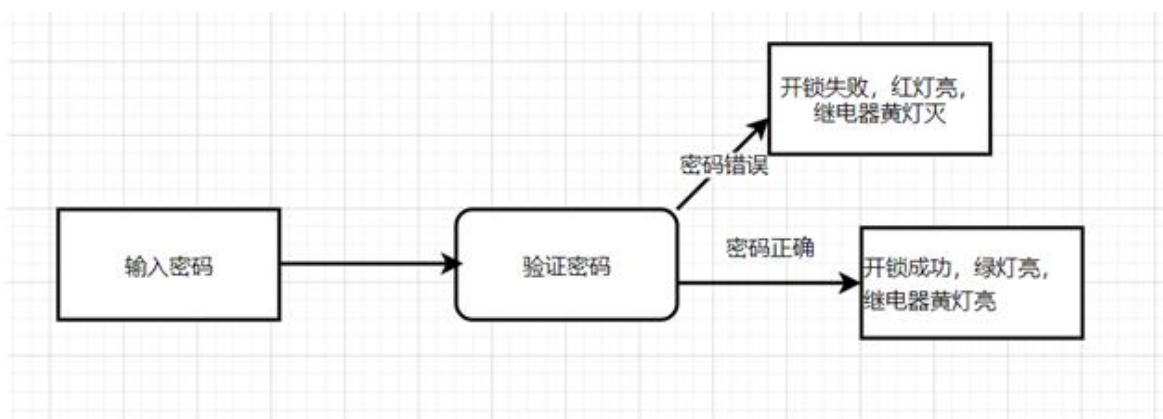# 三、仿真结果展示

四、参考文献

Arduino 软件

ArduinoIDE 加载 Keypad 库

ArduinoIDE 中 Keypad 库示例程序。

五、程序设计


```
#include <LiquidCrystal.h>
```

```cpp
#include <Keypad.h>

const String password = "0088"; //只需修改这个

/* LED&Relay */
const int LED_GREEN_PIN = 11;
const int LED_RED_PIN = 10;
const int RELAY_YELLOW_PIN = 12;

/* Display */
LiquidCrystal lcd(9, 8, 7, 6, 5, 4);

/* Keypad setup */
const byte KEYPAD_ROWS = 4;
const byte KEYPAD_COLS = 4;
byte rowPins[KEYPAD_ROWS] = {3, 2, 19, 18};
byte colPins[KEYPAD_COLS] = {17, 16, 15, 14};
char keys[KEYPAD_ROWS][KEYPAD_COLS] = {
{'1', '2', '3', '/'},
{'4', '5', '6', '*'},
{'7', '8', '9', '-'},
{'.', '0', '=', '+'}
};

Keypad keypad = Keypad(makeKeymap(keys), rowPins, colPins, KEYPAD_ROWS, KEYPAD_COLS);


void updateCursor() {
if (millis() / 250 % 2 == 0 ) {
lcd.cursor();
} else {
lcd.noCursor();
}
}

void setup() {
//Serial.begin(115200);
pinMode(LED_GREEN_PIN, OUTPUT);
pinMode(LED_RED_PIN, OUTPUT);
pinMode(RELAY_YELLOW_PIN, OUTPUT);
digitalWrite(LED_GREEN_PIN, HIGH);
digitalWrite(LED_RED_PIN, HIGH);
digitalWrite(RELAY_YELLOW_PIN, LOW);

lcd.begin(16, 2);
```

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```
lcd.print("PASSWORD");
//lcd.clear();
lcd.cursor();

lcd.setCursor(0, 1);
}

String current = "";
bool overflag = 0;


void processInput(char key) {
current += String(key);
if(overflag == 1){
overflag = 0;
lcd.clear();
lcd.print("PASSWORD");
lcd.setCursor(0, 1);
}
lcd.print(key);
if(current.length() >=4){
delay(500);
if(current==password){
lcd.clear();
lcd.print("PASSWORD");
lcd.setCursor(0, 1);
lcd.print("OPEN");
overflag = 1;
//绿灯亮，连接继电器的黄灯亮。
//LED 低电平亮
digitalWrite(LED_GREEN_PIN, LOW);
digitalWrite(LED_RED_PIN, HIGH);
digitalWrite(RELAY_YELLOW_PIN, HIGH);
}
else{
lcd.clear();
lcd.print("PASSWORD");
lcd.setCursor(0, 1);
lcd.print("INVALID");
overflag = 1;
//红灯亮，连接继电器的黄灯灭。
digitalWrite(LED_GREEN_PIN, HIGH);
digitalWrite(LED_RED_PIN, LOW);
digitalWrite(RELAY_YELLOW_PIN, LOW);
}
current = "";
```

```
}
}

void loop() {
updateCursor();

char key = keypad.getKey();
if (key) {
processInput(key);
}
}




#include <LiquidCrystal.h>
#include <Keypad.h>

const String password = "0088"; //只需修改这个

/* LED&Relay */
const int LED_GREEN_PIN = 11;
const int LED_RED_PIN = 10;
const int RELAY_YELLOW_PIN = 12;

/* Display */
LiquidCrystal lcd(9, 8, 7, 6, 5, 4);

/* Keypad setup */
const byte KEYPAD_ROWS = 4;
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byte rowPins[KEYPAD_ROWS] = {3, 2, 19, 18};
byte colPins[KEYPAD_COLS] = {17, 16, 15, 14};
char keys[KEYPAD_ROWS][KEYPAD_COLS] = {
{'1', '2', '3', '/'},
{'4', '5', '6', '*'},
{'7', '8', '9', '-'},
{'.', '0', '=', '+'}
};

Keypad keypad = Keypad(makeKeymap(keys), rowPins, colPins, KEYPAD_ROWS, KEYPAD_COLS);


void updateCursor() {
if (millis() / 250 % 2 == 0 ) {
lcd.cursor();
} else {
```

```arduino
    lcd.noCursor();
    }
}

void setup() {
    //Serial.begin(115200);
    pinMode(LED_GREEN_PIN, OUTPUT);
    pinMode(LED_RED_PIN, OUTPUT);
    pinMode(RELAY_YELLOW_PIN, OUTPUT);
    digitalWrite(LED_GREEN_PIN, HIGH);
    digitalWrite(LED_RED_PIN, HIGH);
    digitalWrite(RELAY_YELLOW_PIN, LOW);

    lcd.begin(16, 2);

    lcd.print("PASSWORD");
    //lcd.clear();
    lcd.cursor();

    lcd.setCursor(0, 1);
}

String current = "";
bool overflag = 0;


void processInput(char key) {
    current += String(key);
    if(overflag == 1){
    overflag = 0;
    lcd.clear();
    lcd.print("PASSWORD");
    lcd.setCursor(0, 1);
    }
    lcd.print(key);
    if(current.length() >=4){
    delay(500);
    if(current==password){
    lcd.clear();
    lcd.print("PASSWORD");
    lcd.setCursor(0, 1);
    lcd.print("OPEN");
    overflag = 1;
    //绿灯亮，连接继电器的黄灯亮。
    //LED 低电平亮
    digitalWrite(LED_GREEN_PIN, LOW);
```

```
digitalWrite(LED_RED_PIN, HIGH);
digitalWrite(RELAY_YELLOW_PIN, HIGH);
}
else{
lcd.clear();
lcd.print("PASSWORD");
lcd.setCursor(0, 1);
lcd.print("INVALID");
overflag = 1;
//红灯亮，连接继电器的黄灯灭。
digitalWrite(LED_GREEN_PIN, HIGH);
digitalWrite(LED_RED_PIN, LOW);
digitalWrite(RELAY_YELLOW_PIN, LOW);
}
current = "";
}
}

void loop() {
updateCursor();

char key = keypad.getKey();
if (key) {
processInput(key);
}
}
```