Arduino 期末專題

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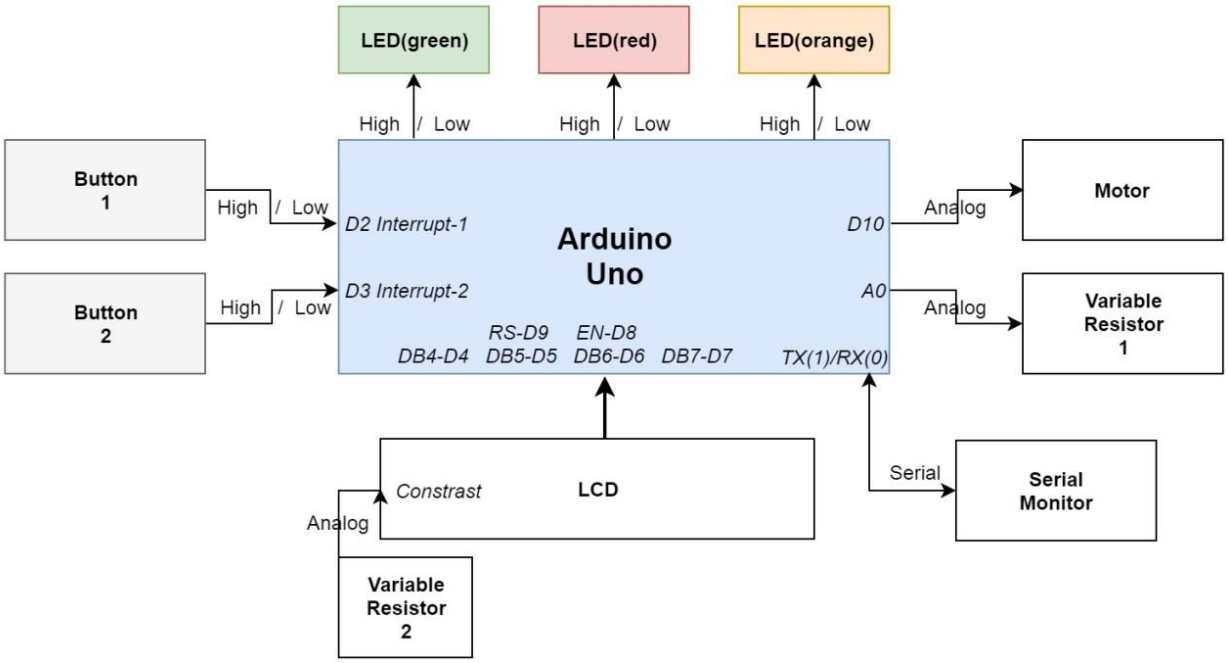
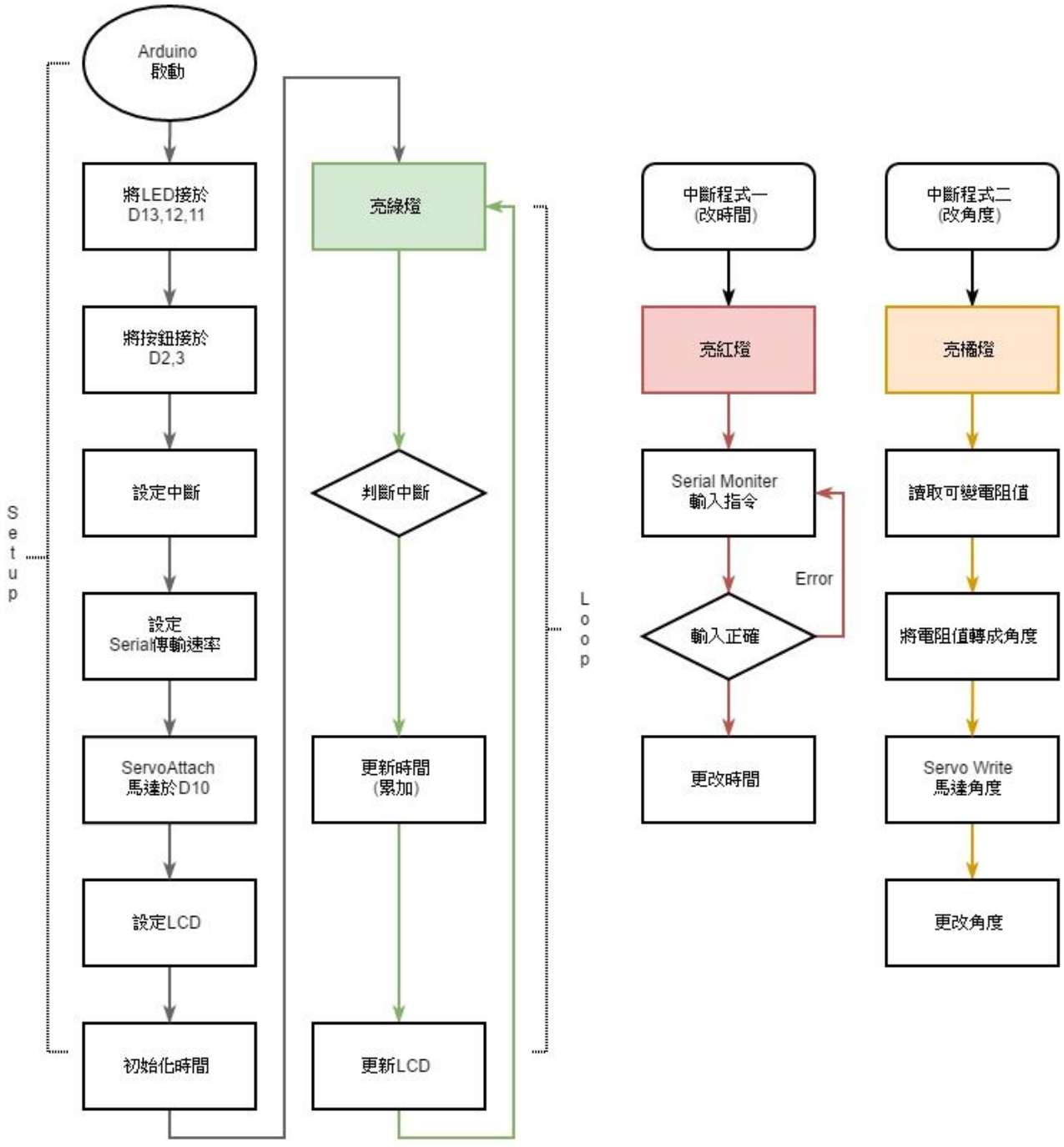
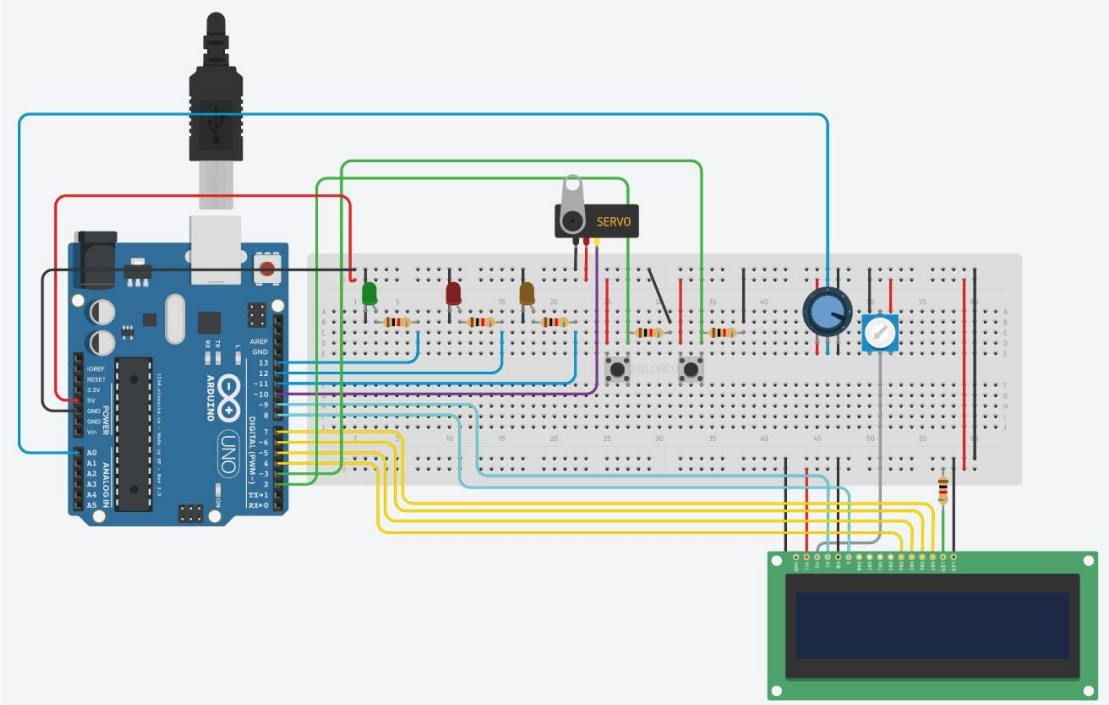
1. 系統架構圖



2. 系統流程圖


Arduino
啟動
將LED接於
D13,12,11
將按鈕接於
D2,3
設定中斷
設定
Serial傳輸速率
ServoAttach
馬達於D10
設定LCD
初始化時間
Setup
亮綠燈
判斷中斷
更新時間
(累加)
更新LCD
Loop
中斷程式一
(改時間)
亮紅燈
Serial Moniter
輸入指令
Error
輸入正確
更改時間
中斷程式二
(改角度)
亮橘燈
讀取可變電阻值
將電阻值轉成角度
Servo Write
馬達角度
更改角度

3.接線圖



4.程式碼

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

//角度
Servo myservo;
static int analogValue = 0;
int out = 9;
int pos = 0;

//LCD
LiquidCrystal lcd(9, 8, 4, 5, 6, 7);
const byte interruptPin = 2;
const byte interruptPin2 = 3;
int i = 0;
int dowhat = 0;
int check = 0 ;
```

```
//time
int month = 0;
int day = 0;
int hour = 0;
int minute = 0;
int second = 0;

void interrupt1(){    //change time
  dowhat = 1;
  digitalWrite(13,LOW);
  digitalWrite(12,HIGH);
}  // 中斷一

void interrupt2(){    //change 角度
  dowhat = 2;
  digitalWrite(13,LOW);
  digitalWrite(11,HIGH);
}  //中斷二

void time() {     //  輸入時間(有除錯功能)
  Serial.println( "please key in date & time" );
  Serial.println("month:");
   //月
    month = Serial.parseInt();
    if ( month > 12 || month < 0 ) {
      Serial.println( "ERROR,please key in again" );
      time();
    }
    Serial.println("day:");

   //日
    day = Serial.parseInt();
  if ( day < 0 ) {
      Serial.println( "ERROR,please key in again" );
      time();
  }
    if ( month == 2 ) {   //二月份
```

```
      if( day > 28 ) {
        Serial.println( "ERROR,please key in again" );
        time();
      }
    }
    else {
      if ( month == 1 || month == 3 || month == 5 || month == 7 || month
== 8 || month == 10 || month == 12 ) {
        if ( day > 31 ) {
          Serial.println( "ERROR,please key in again" );
          time();
        }
      } // 大月份
      else {
        if ( day > 30 ){
          Serial.println( "ERROR,please key in again" );
          time();
        }
      } // 小月份
    } // else
    Serial.println("hour:");

   //時
    hour = Serial.parseInt();
  if ( hour > 24 || hour < 0 ) {
      Serial.println( "ERROR,please key in again" );
      time();
  }
    Serial.println("minute:");

  //分
    minute = Serial.parseInt();
  if ( minute > 59 || minute < 0 ){
      Serial.println( "ERROR,please key in again" );
      time();
  }
    Serial.println("second:");
```

```
   //秒
    second = Serial.parseInt();
  if ( second > 59 || second < 0 ){
      Serial.println( "ERROR,please key in again" );
    time();
  }
}

void raise() {   // 跑時間
  second = second + 1;
  if( second >= 60 ) {
    second = 0;
    minute = minute + 1;
  }
  if( minute >= 60 ) {
    minute = 0;
    hour = hour + 1;
  }
  if( hour >= 24 ) {
    hour = 0;
    day = day + 1;
  }
   if ( month == 1 || month == 3 || month == 5 || month == 7 || month ==
8 || month == 10 || month == 12 ) {
     if ( day > 31 ) {
       day = 1;
       month = month + 1;
     }
     if( month > 12 )
       month = 0;
  }
  else{
    if ( month == 2 ) {
      if ( day > 28 ) {
        day = 1;
        month = month + 1;
      }
    }
```

```
    else {
      if ( day > 30 ) {
        day = 1;
        month = month + 1;
      }
    }
  }
  delay(100); //因為有程式執行時間問題 所以讓她delay小於一秒
  //(可能每台電腦delay時間不一樣，我電腦跑比較久所以delay寫很小)
}

void setup() {
  pinMode(13, OUTPUT); // 設定LED腳位
  pinMode(12, OUTPUT);
  pinMode(11, OUTPUT);
  pinMode(interruptPin, INPUT);  // 設定按鈕腳位(中斷腳位)

attachInterrupt(digitalPinToInterrupt(interruptPin),interrupt1,RISING
); //中斷功能
  pinMode(interruptPin2, INPUT);
attachInterrupt(digitalPinToInterrupt(interruptPin2),interrupt2,RISIN
G);
  Serial.begin(9600);    // Serial傳輸速率設定
  myservo.attach(10);     //設定馬達腳位

  lcd.begin(16, 2);// set up the LCD's number of columns and rows
  lcd.setCursor(1,0); // Print a message to the LCD.
  lcd.print("0 :0 :0  0 /0");  //初始時間顯示
  lcd.setCursor(10,1);
  lcd.print(pos);  // 初始角度顯示
}

void loop() {
  if( dowhat == 1 ) {   //中斷一
    time();
    dowhat = 0;
    digitalWrite(12,LOW);
    check = 1;
```

```
  }
  else{
    if( dowhat == 2 ) {   //中斷二
      analogValue = analogRead(A0);
      pos = ( (float)analogValue/1023 )*180 ;
      myservo.write(pos);
      dowhat = 0;
      check = 1;
      delay(1000);
      digitalWrite(11,LOW);
    } // if
    else {   //無中斷
      digitalWrite(13,HIGH);
      if( check == 1 ) {
        raise();  //跑時間
        lcd.setCursor(1,0);
        lcd.print(hour);
        lcd.setCursor(3,0);
        lcd.print(":");
        lcd.setCursor(4,0);
        lcd.print(minute);
        lcd.setCursor(6,0);
        lcd.print(":");
        lcd.setCursor(7,0);
        lcd.print(second);
        lcd.setCursor(10,0);
        lcd.print(month);
        lcd.setCursor(12,0);
        lcd.print("/");
        lcd.setCursor(13,0);
        lcd.print(day);

        lcd.setCursor(10,1);
        lcd.print(pos);
      }
    } // else
  }
}
```

5.連結

<iframe frameborder='0' height='448' marginheight='0' marginwidth='0' scrolling='no'
src='https://circuits.io/circuits/3581064-final-project/embed#breadboard' width='650'></iframe>

6.使用方式與時間格式

```
//LCD 顯示---第一行---> 時 :分 :秒  月 /日
//----------第二行----->              角度
//////////////////////////////////////////////////
//最初 LCD 會顯示時間跟角度的初始值(皆為 0)
//若想設定時間(執行中斷一)----->按左邊按鈕(亮紅燈)
//若想讀取當前類比電壓(執行中斷二)->按右邊按紐(亮橘燈)
//(設定時間需要一個個依照指令輸入，麻煩使用者等待 Serial)
//設定||讀取完畢後會持續顯示當前時間，時間累加(亮綠燈)
//////////////////////////////////////////////////
```