實驗四七段顯示器控制

實驗目的： Arduino UNO串列輸入與七段顯示器控制應用，結果可經由串列通訊了解結果。

實驗步驟：

1. Arduino透過麵包板連接一個七段顯示器，一開始七段顯示器顯示0。接著每一秒鐘改變顯示內容，由0到9。(請使用課本範例測試硬體接線是否正確)

int timer = 100,i,j;

int ledPins[7] = { 3, 4, 5, 6, 7, 8, 9};

char num[10] = {0x3f,0x06,0x5b,0x4f,0x66,0x6d,0x7d,0x27,0x7f,0x67};

int pinCount = 7;

void setup() {

for (int thisPin = 0; thisPin < pinCount; thisPin++) {

pinMode(ledPins[thisPin], OUTPUT);

}

}

void loop() {

for(i=0;i<10;i++)

{

out(num[i]);

delay(500);

}

}

void out(byte data)

{

for(j=0;j<7;j++)

{

if(data % 2 == 1)

digitalWrite(ledPins[j],HIGH);

else

digitalWrite(ledPins[j],LOW);

data= data/2;

}

}

1. 測試硬體接線沒有問題時，在修改程式碼，由串列通訊讀取PC的輸入字元，若是輸入範圍在0~9, A~F(A~F需要大小寫都可以完成)，則顯示在七段顯示器上。重複執行讀取顯示之功能。(檢查)

int i,j;

int ledPins[7] = { 3, 4, 5, 6, 7, 8, 9};

char num[10] = {0x3f,0x06,0x5b,0x4f,0x66,0x6d,0x7d,0x27,0x7f,0x67};

char letter[10] = {0x77,0x7c,0x39,0x5e,0x79,0x71};

int pinCount = 7;

void setup() {

for (int thisPin = 0; thisPin < pinCount; thisPin++) {

pinMode(ledPins[thisPin], OUTPUT);

}

Serial.begin(9600);

}

void loop() {

if(Serial.available())

{

char char\_in = Serial.read();

Serial.println(char\_in);

if('0'<=char\_in && char\_in<='9') //如果字元介於1~9

{

int int\_in = char\_in - '0' + 0; //字元數字變為int數字

out(num[int\_in]);

}

else if('a'<=char\_in && char\_in<='f' || 'A'<=char\_in && char\_in<='F')//如果字元介於A~F

{

if('A'<=char\_in && char\_in<='F')

{

char\_in = char\_in - 'A' + 'a';//大寫轉小寫

}

int int\_in = char\_in - 'a' + 0;//變為數字，計算小寫字母轉換成a~f是第幾個

out(letter[int\_in]);

}

}

}

void out(byte data)

{

for(j=0;j<7;j++)

{

if(data % 2 == 1)

digitalWrite(ledPins[j],HIGH);

else

digitalWrite(ledPins[j],LOW);

data= data/2;

}

}

1. 請設計出共陰七段顯示器0~9, A~F的數值。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 十六進位 | 0x3F | 0x06 | 0x5b | 0x4f | 0x66 | 0x6d | 0x7d | 0x27 | 0x7f | 0x67 | 0x77 | 0x7c | 0x39 | 0x5e | 0x79 | 0x71 |
| 十進位 | 63 | 6 | 91 | 79 | 102 | 109 | 125 | 39 | 127 | 103 | 119 | 124 | 57 | 94 | 121 | 113 |