Mbed Lab 7 Report
Serial Communication

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一、Lab Description

1、mbed SPI Self Loopback

說明：

建立兩個Thread，分別為master、slave，定義好master、slave 的 mosi, miso, sclk 腳位，以及 slave 的 cs。

以下設定master傳輸為8bit，clock頻率為1MHz：

spi.format(8, 3);

spi.frequency(1000000);

以下為步驟：

1、當cs = 0為選擇Slave，透過cs控制傳輸時間以及選擇傳輸對象

2、Master寄0xaa給Slave

3、slave收到之後 Print：First Read from master: v = aa

4、 Master 收到之後，將device deselect，並Print：First response from slave = 10

5、接下來Master寄number給Print：Slave：Send number =

6、Slave收到之後 Print：Second Read from master: v =，並回傳 v = v + 10給response

7、 Master 收到之後， Print：Second response from slave =

```
Send handshaking codes.
First Read from master: v = aa
First response from slave = 0
Send number = 0
Second Read from master: v = 0
Second response from slave = 10
Send handshaking codes.
First Read from master: v = aa
First response from slave = 0
Send number = 1
Second Read from master: v = 1
Second response from slave = 11
Send handshaking codes.
First Read from master: v = aa
First response from slave = 0
Send number = 2
Second Read from master: v = 2
Second response from slave = 12
Send handshaking codes.
First Read from master: v = aa
First response from slave = 0
Send number = 3
Second Read from master: v = 3
Second response from slave = 13
Send handshaking codes.
First Read from master: v = aa
First response from slave = 10
Send number = 4
Second Read from master: v = 4
Second response from slave = 14
```

一、Lab Description

2、mbed UART loopback

說明：

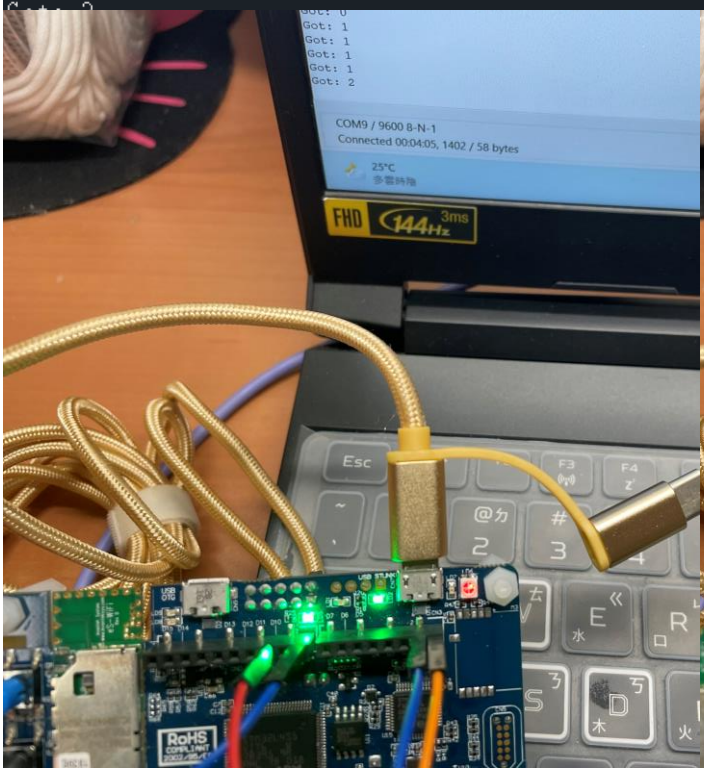
同樣建立兩個Thread，分別為master、slave，利用 BufferedSerial 物件定義好master、slave以及 serial port的 TX、RX腳位。在main中約定好傳輸鮑率為9600。

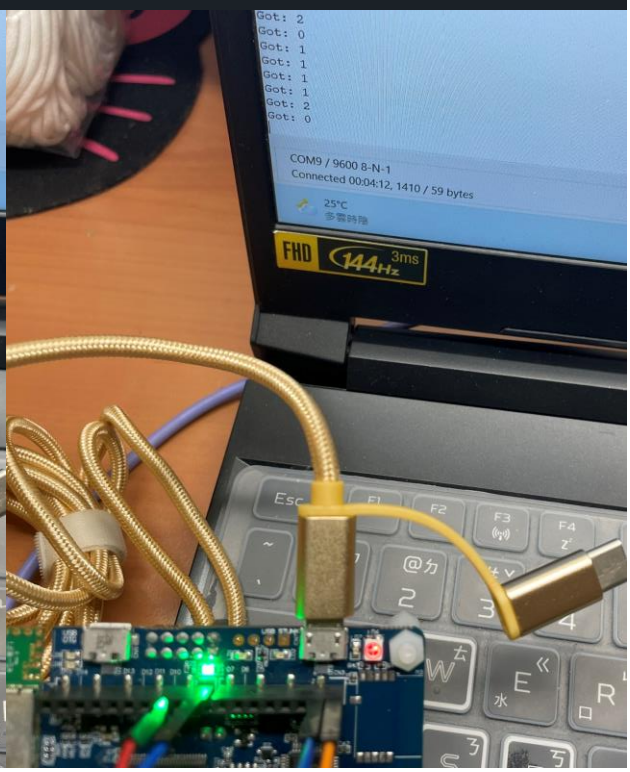
1、Master：Print：Blinking LED1 and LED2 in order twice後，每秒傳buf1裡的一個資訊給Slave

2、Slave收到後，依照程式收到指令變更led燈狀態，並 Print：Got:

3、接下來Master print：Waiting for command from terminal. 0: turn off both. 1: turn on LED1. 2: turn on LED2.並進入while迴圈，讀取terminal值，接收到後，不停回傳給Slave

```
Waiting for command from terminal. 0: turn off both. 1: turn on LED1. 2: turn on LED2.
Blinking LED1 and LED2 in order twice
Got: 0
Got: 1
Got: 2
Got: 0
Got: 1
```





一、Lab Description

3、Build your own LCD library I2C version

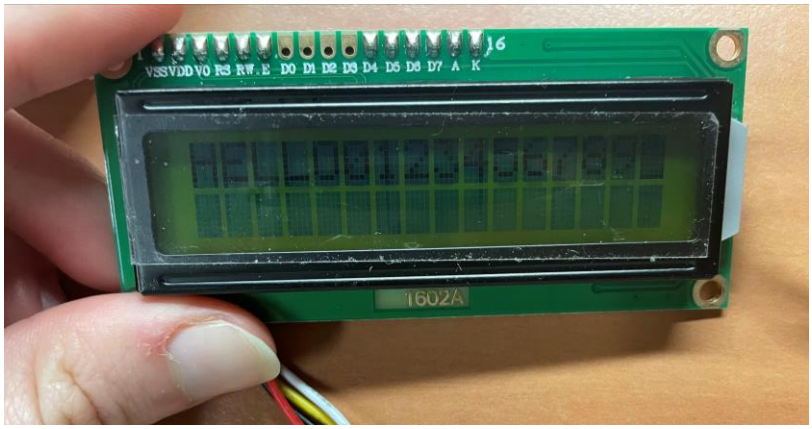
說明：

將code複製進LCD.cpp、LCD.h檔中，

其中I2C _i2c(D14, D15);

可以看到，利用i2c的方式，我們可以只用SDA、SCL兩條達到傳輸資料就不須樣要像之前的Lab接很多繁雜的線。

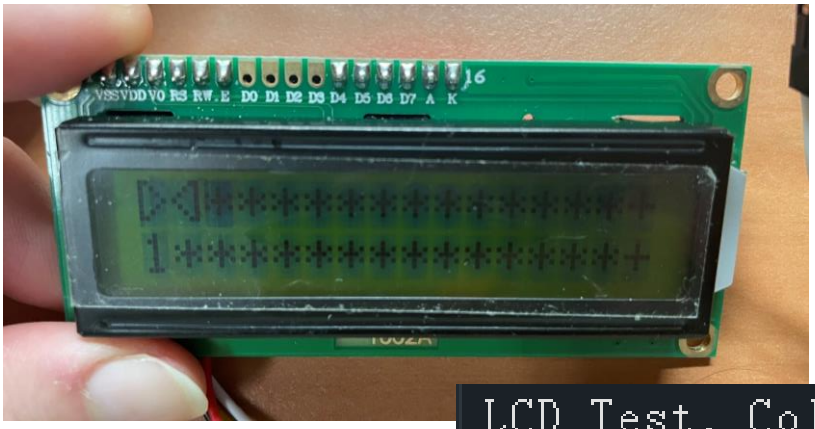
此範例程式要我們印出HELLO123456789。



4、Import TextLCD library for I2C

說明：

將函式庫加入mbed中使用印出



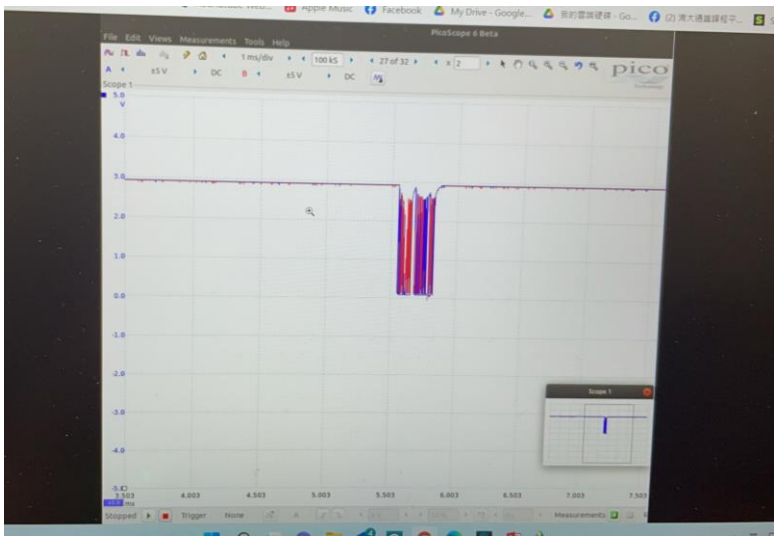

```
LCD Test. Columns=16, Rows=2
MemAddr(Col=0, Row=0)=0x00
MemAddr(Col=15, Row=0)=0x0F
MemAddr(Col=0, Row=1)=0x40
MemAddr(Col=15, Row=1)=0x4F
```

一、Lab Description

5、TMP102 with I2C

說明：

TMP102是一個以i2c為通訊協定的溫度傳感器，利用 Picoscope 監測i2c傳輸的訊號，得到以下結果。



```
Temp = 25.500000.
Temp code=(25, 112)
Temp = 25.437500.
Temp code=(25, 112)
Temp = 25.437500.
Temp code=(25, 128)
Temp = 25.500000.
Temp code=(25, 128)
Temp = 25.500000.
Temp code=(25, 112)
Temp = 25.437500.
Temp code=(25, 128)
Temp = 25.500000.
Temp code=(25, 128)
Temp = 25.500000.
Temp code=(25, 112)
Temp = 25.437500.
Temp code=(25, 128)
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Temp code=(25, 128)
Temp = 25.500000.
Temp code=(25, 128)
Temp = 25.500000.
Temp code=(25, 128)
Temp = 25.500000.
Temp code=(25, 112)
Temp = 25.437500.
```