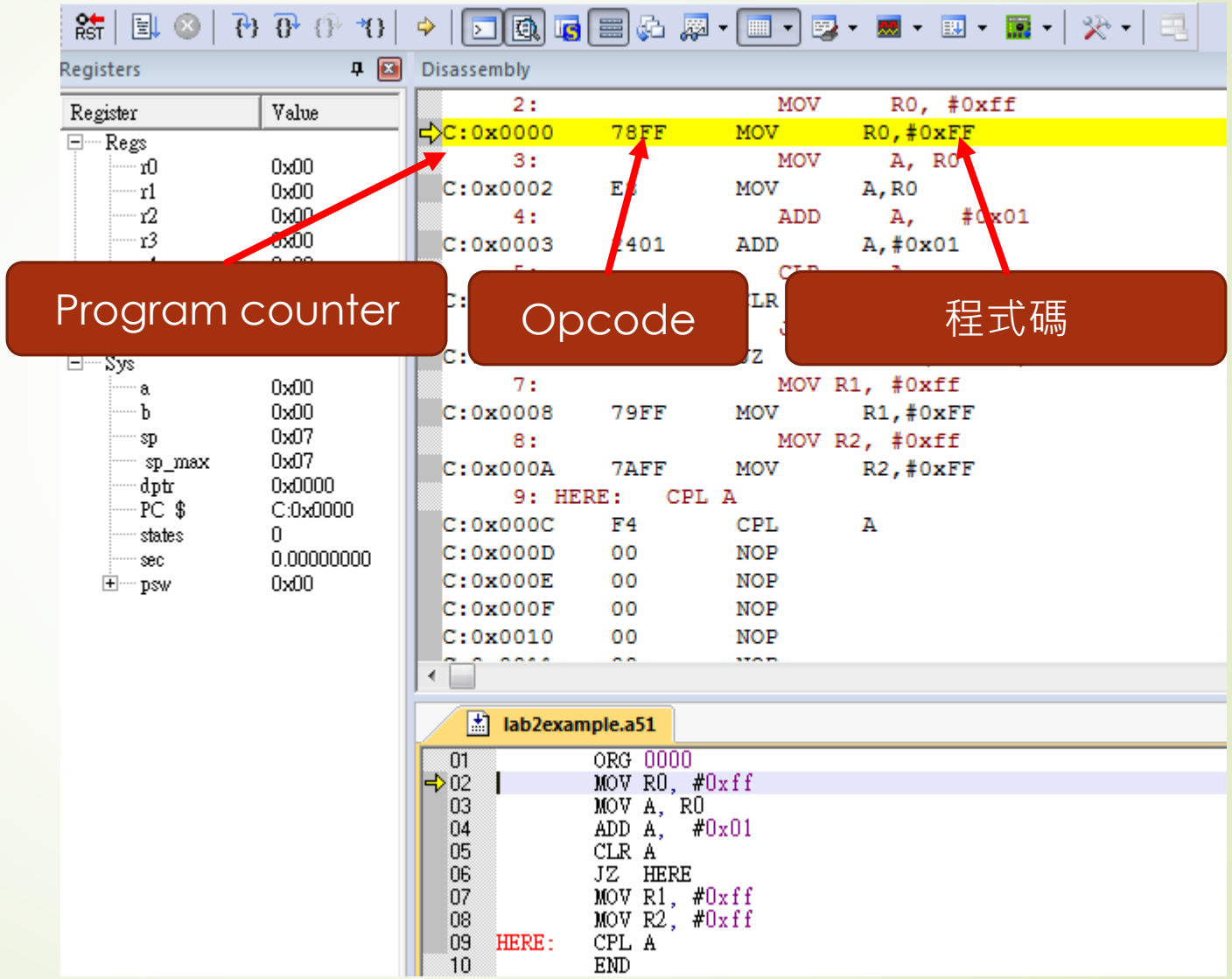
8051實習

2017/10/16

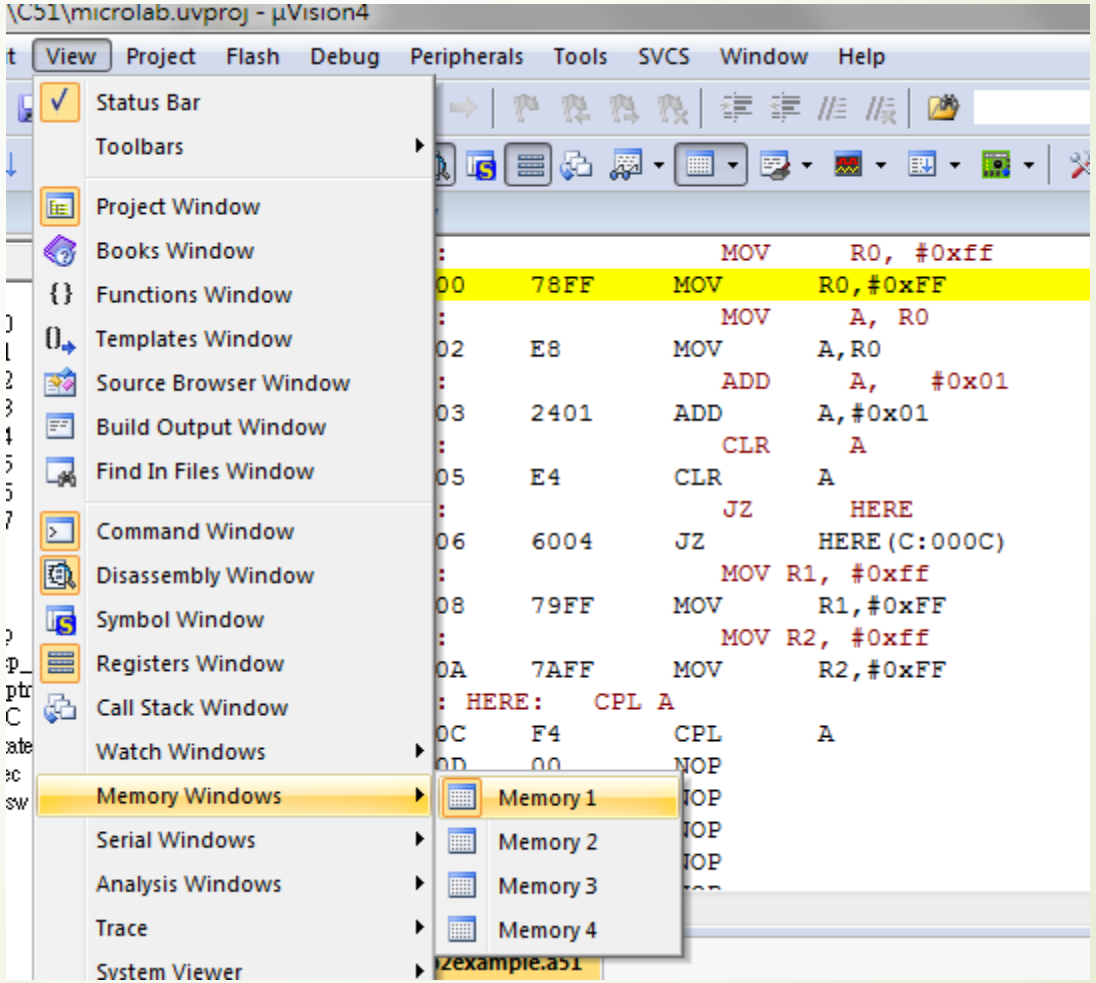
觀看program counter與opcode

在debug模式下



觀看記憶體位置的內容

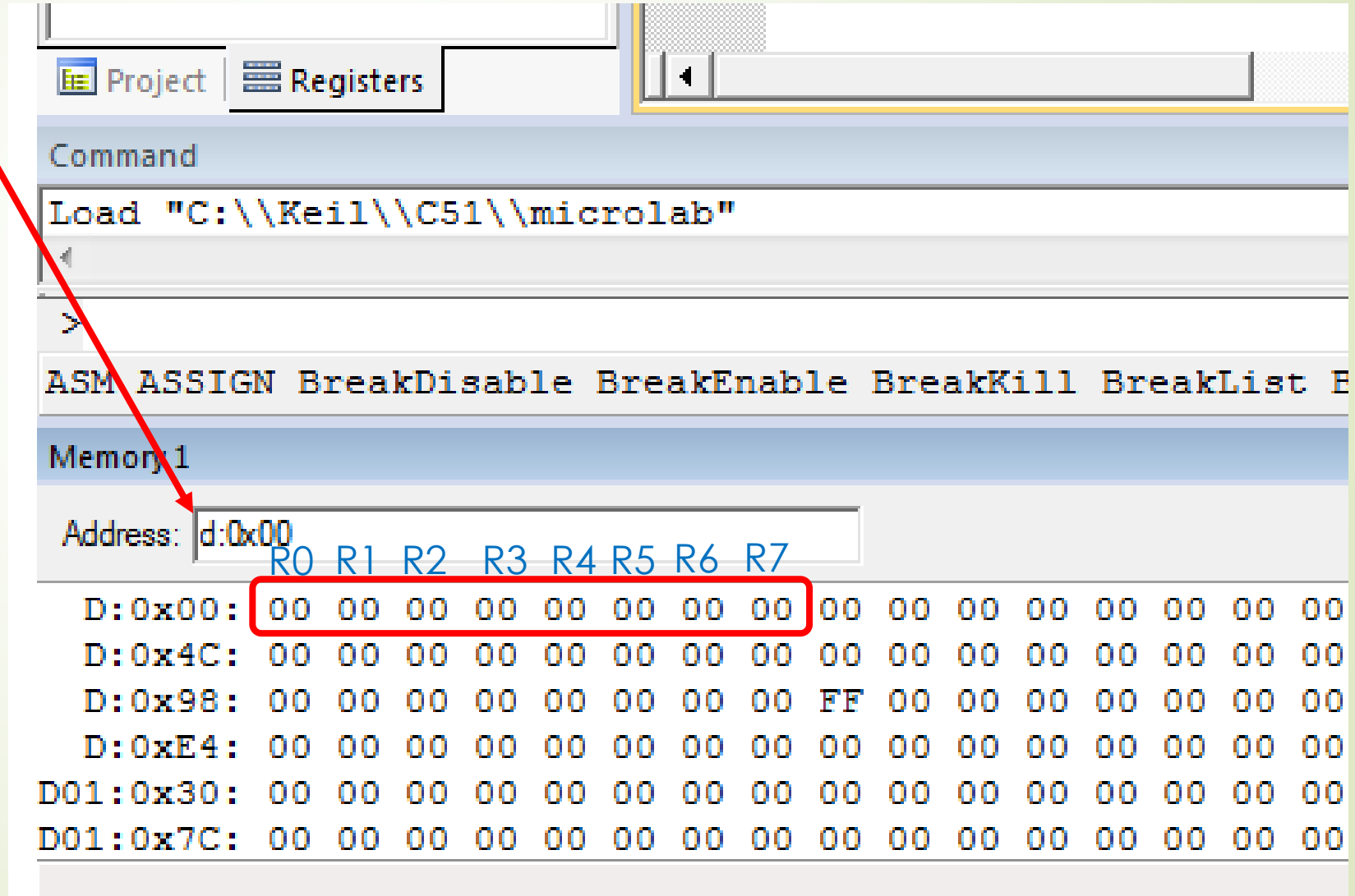
在debug模式下



觀看記憶體位置的內容

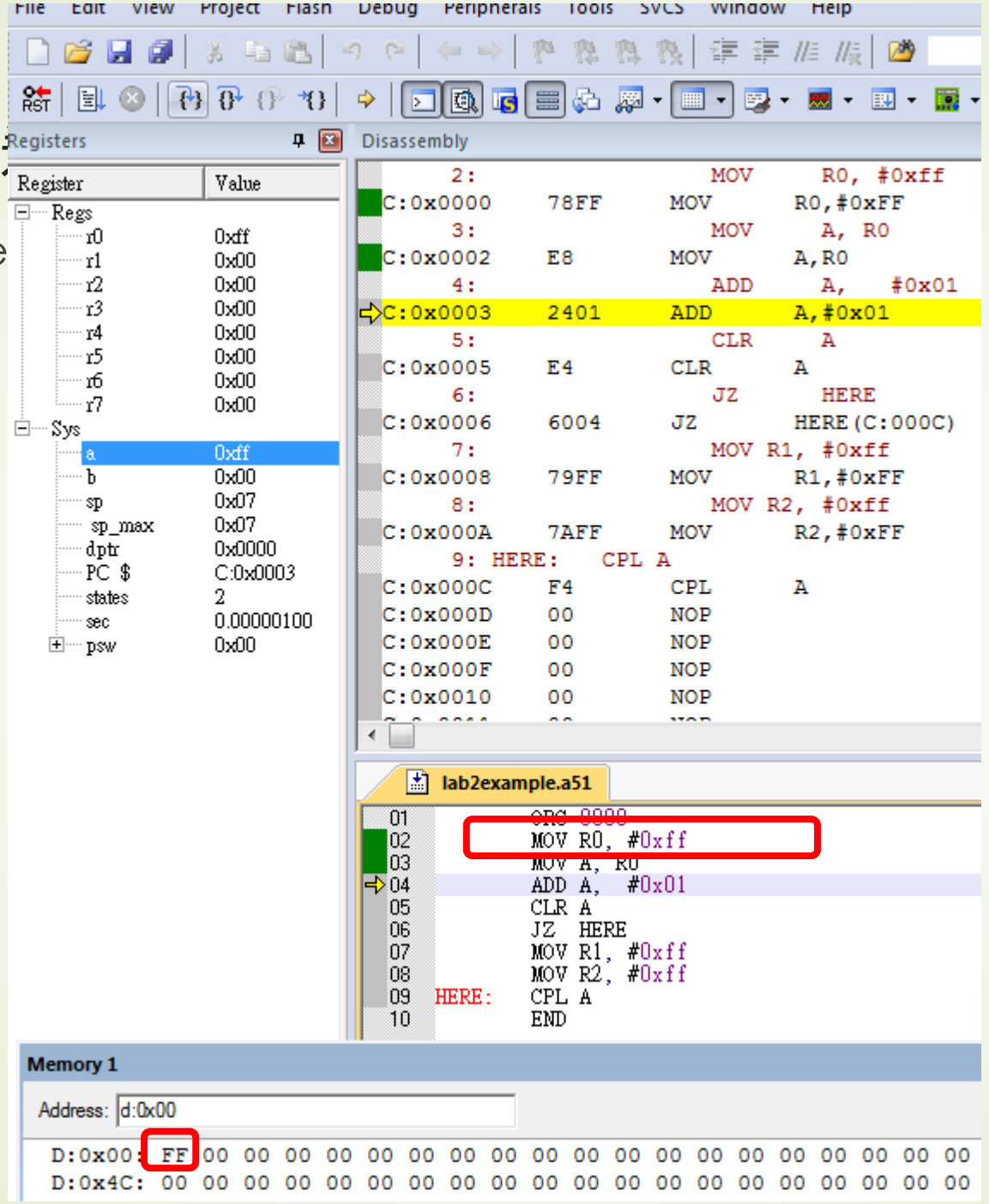
在debug模式下

輸入d:0x00



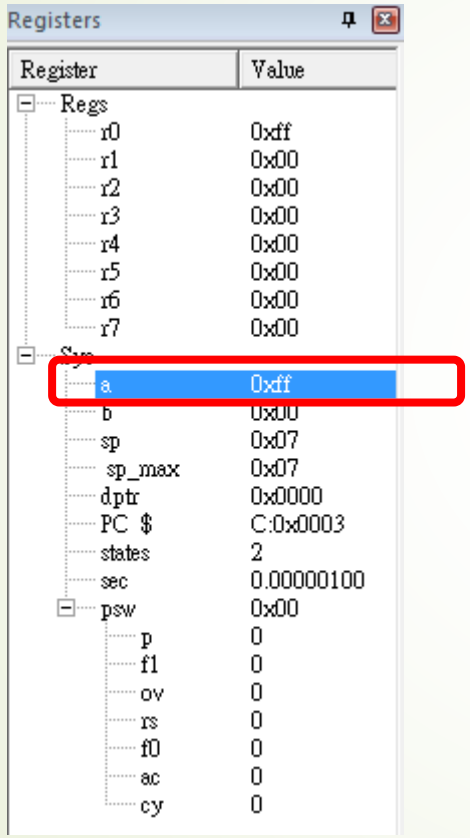
觀

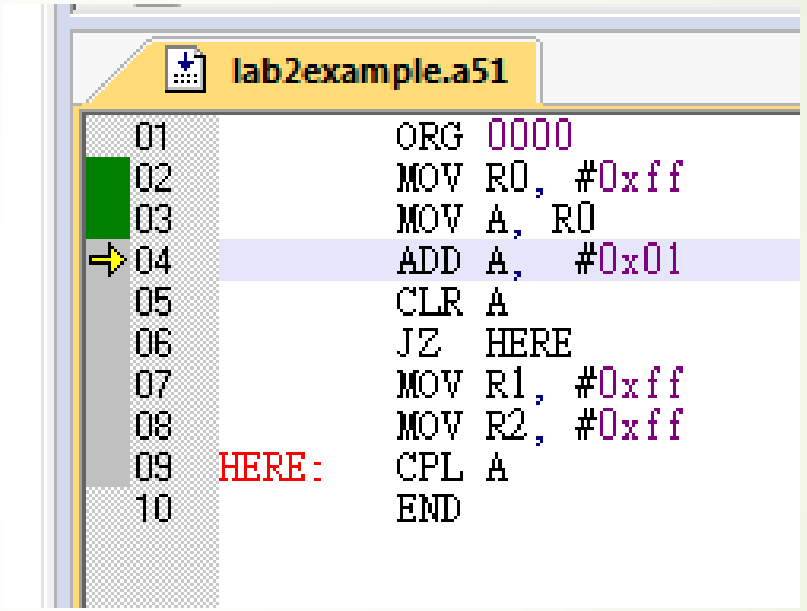
在de


File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
Registers
Register Value
Regs
r0 0xff
r1 0x00
r2 0x00
r3 0x00
r4 0x00
r5 0x00
r6 0x00
r7 0x00
Sys
a 0xff
b 0x00
sp 0x07
sp_max 0x07
dptr 0x0000
PC $ C:0x0003
states 2
sec 0.00000100
psw 0x00
Disassembly
2: MOV R0, #0xff
C:0x0000 78FF MOV R0,#0xFF
3: MOV A, R0
C:0x0002 E8 MOV A,R0
4: ADD A, #0x01
C:0x0003 2401 ADD A,#0x01
5: CLR A
C:0x0005 E4 CLR A
6: JZ HERE
C:0x0006 6004 JZ HERE(C:000C)
7: MOV R1, #0xff
C:0x0008 79FF MOV R1,#0xFF
8: MOV R2, #0xff
C:0x000A 7AFF MOV R2,#0xFF
9: HERE: CPL A
C:0x000C F4 CPL A
C:0x000D 00 NOP
C:0x000E 00 NOP
C:0x000F 00 NOP
C:0x0010 00 NOP
lab2example.a51
01 ORG 0000
02 MOV R0, #0xff
03 MOV A, R0
04 ADD A, #0x01
05 CLR A
06 JZ HERE
07 MOV R1, #0xff
08 MOV R2, #0xff
09 HERE: CPL A
10 END
Memory 1
Address: d:0x00
D:0x00: FF 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
D:0x4C: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

觀看CY的變化

在debug模式下

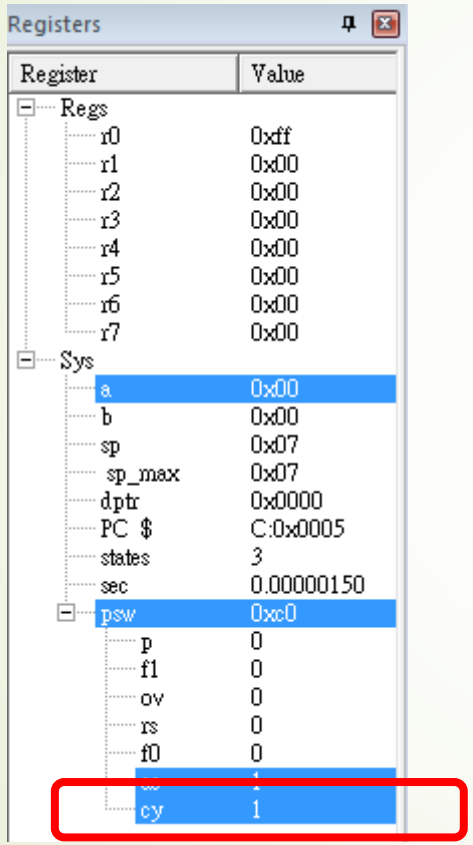


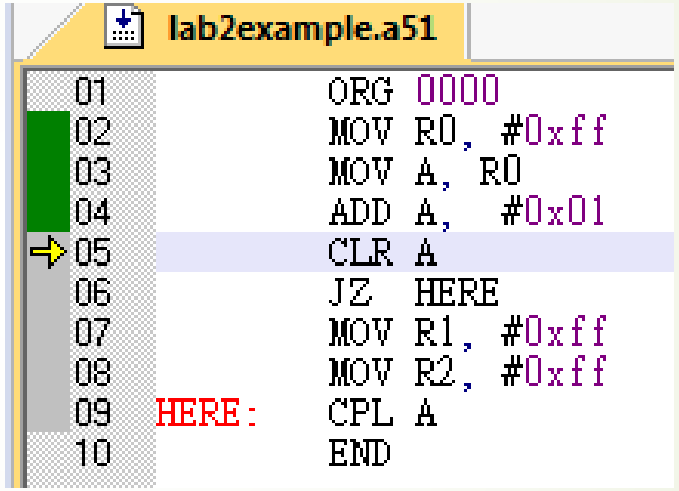


在這個範例程式中，程式執行完第三行，此時A的內容為0xff。

觀看CY的變化

在debug模式下

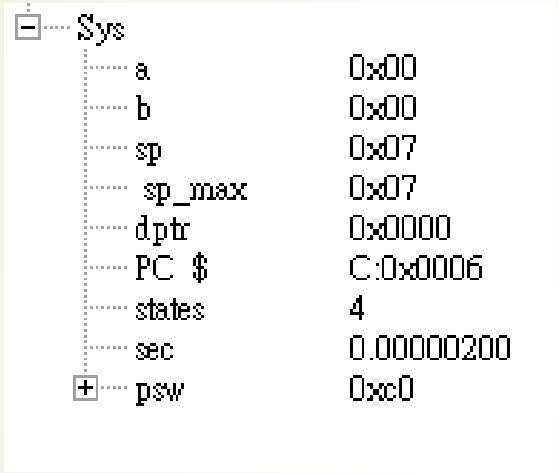




接者程式執行完第四行時，將A加上0x01，而導致最高位元有進位的情況產生，所以在執行完第四行後，可以觀察到CY由0變為1。

Calculating Short Jump Address

在debug模式下




```
      2:                MOV     R0, #0xff
C:0x0000    78FF      MOV       R0,#0xFF
      3:                MOV     A, R0
C:0x0002    E8        MOV       A,R0
      4:                ADD     A,   #0x01
C:0x0003    2401      ADD       A,#0x01
      5:                CLR     A
C:0x0005    E4        CLR       A
      6:                JZ      HERE
C:0x0006    6004      JZ        HERE(C:000C)
      7:                MOV R1, #0xff
C:0x0008    79FF      MOV       R1,#0xFF
      8:                MOV R2, #0xff
C:0x000A    7AFF      MOV       R2,#0xFF
      9: HERE:   CPL A
C:0x000C    F4        CPL       A
C:0x000D    00        NOP
```

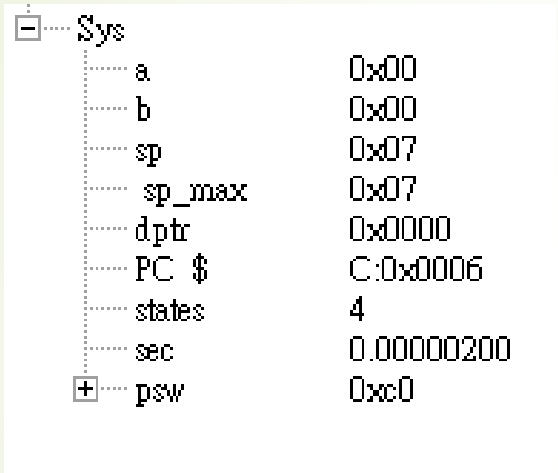
在著個範例程式中，程式執行完第五行，此時A的內容0x00，所以在0x0006的位置執行JZ HERE後會JUMP到0x000C的位置執行CPL A。

HINT:
JZ HERE：如果A的暫存器為0，則跳到HERE，反之執行下一步。

```
01              ORG 0000
02              MOV R0, #0xff
03              MOV A, R0
04              ADD A,  #0x01
05              CLR A
06              JZ  HERE
07              MOV R1, #0xff
08              MOV R2, #0xff
09  HERE:       CPL A
10              END
```

Calculating Short Jump Address

在debug模式下




```
      2:                MOV     R0, #0xff
C:0x0000    78FF      MOV       R0,#0xFF
      3:                MOV     A, R0
C:0x0002    E8        MOV       A,R0
      4:                ADD     A,   #0x01
C:0x0003    2401      ADD       A,#0x01
      5:                CLR     A
C:0x0005    E4        CLR       A
      6:                JZ      HERE
C:0x0006    6004      JZ        HERE(C:000C)
      7:                MOV R1, #0xff
C:0x0008    79FF      MOV       R1,#0xFF
      8:                MOV R2, #0xff
C:0x000A    7AFF      MOV       R2,#0xFF
      9: HERE:   CPL A
C:0x000C    F4        CPL       A
C:0x000D    00        NOP
```

計算方式：位置0x0006內容的運算元，也就是位置0x007的內容04h，加上下一行程式碼的位置0x0008，其結果為0x00c 。

```
01              ORG 0000
02              MOV R0, #0xff
03              MOV A, R0
04              ADD A,  #0x01
05              CLR A
06              JZ  HERE
07              MOV R1, #0xff
08              MOV R2, #0xff
09  HERE:       CPL A
10              END
```

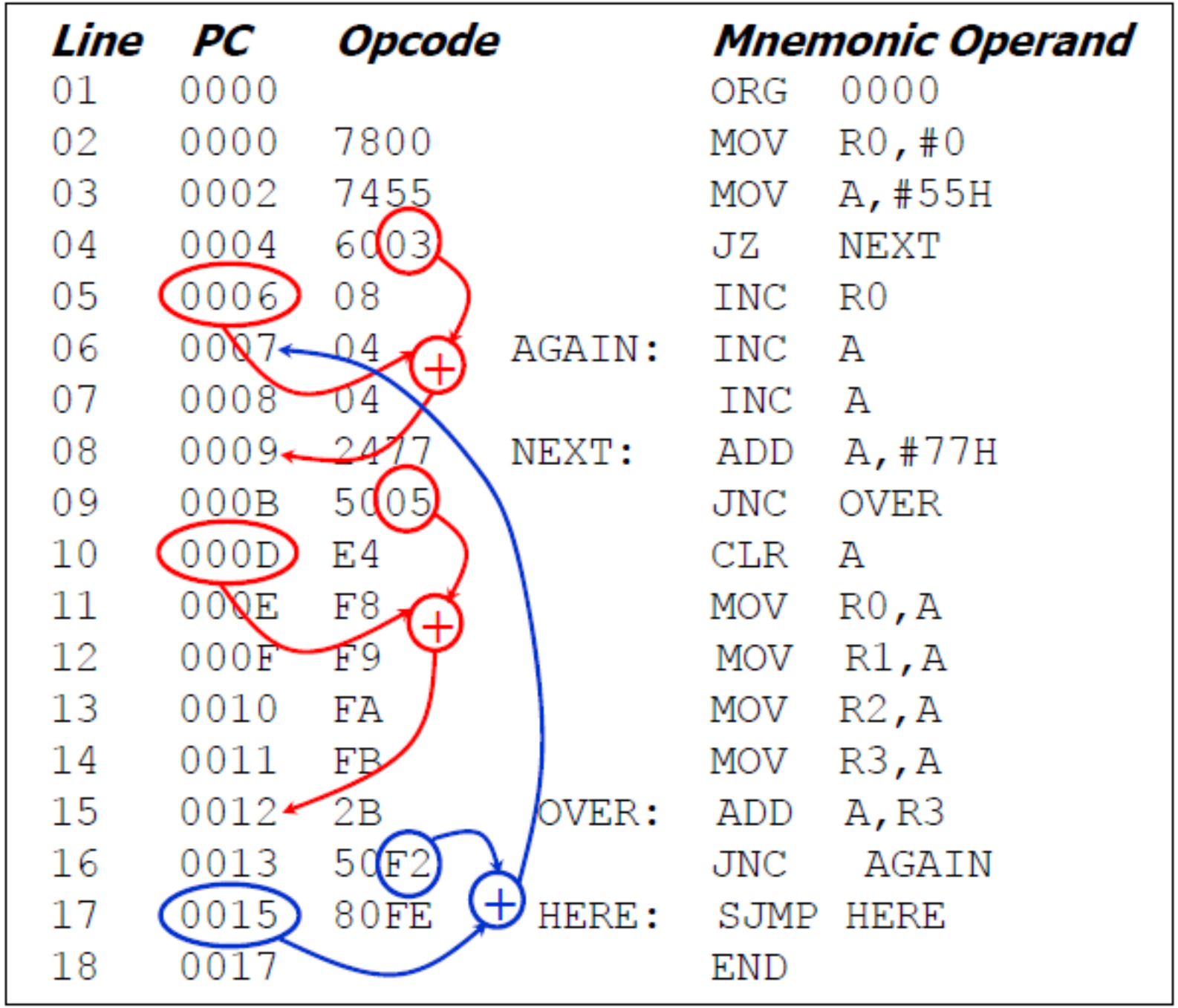
練習

輸入此程式碼，在執行過程中觀察R0~R3記憶體內容以及CY的變化，並回答出JZ NEXT, JNC OVER以及JNC AGAIN的JUMP Address。

HINT:

INC：暫存器值加一。

JNC：CY=0時跳。



Line	PC	Opcode		Mnemonic	Operand
01	0000			ORG	0000
02	0000	7800		MOV	R0,#0
03	0002	7455		MOV	A,#55H
04	0004	6003		JZ	NEXT
05	0006	08		INC	R0
06	0007	04	AGAIN:	INC	A
07	0008	04		INC	A
08	0009	2477	NEXT:	ADD	A,#77H
09	000B	5005		JNC	OVER
10	000D	E4		CLR	A
11	000E	F8		MOV	R0,A
12	000F	F9		MOV	R1,A
13	0010	FA		MOV	R2,A
14	0011	FB		MOV	R3,A
15	0012	2B	OVER:	ADD	A,R3
16	0013	50F2		JNC	AGAIN
17	0015	80FE	HERE:	SJMP	HERE
18	0017			END	