ECE 425 Introductions to Microprocessors
Laboratory Work 7

Objective:

1) Return with literal in W command ---**retlw k**---
2) Look-UP tables.
3) Seven-Segment Display control using PIC16F84.

Preparation:

1) Explain the use of **"retlw k"** command.
2) Study the program segment below. What do you expect to see at PORTB when the program is run?

```
LIST P=16F84A
INCLUDE "P16f84A.INC"

__config _CP_OFF&_WDT_OFF&_XT_OSC

bsf  STATUS, RP0;
clrf TRISB;
bcf  STATUS, RP0;
clrf PORTB;

main_part

        movlw  .2;
        call   my_lookUP_table;
        movwf  PORTB;

loop goto loop

my_lookUP_table

        addwf  PCL, F;
        retlw  0x00;
        retlw  0x01;
        retlw  0x02;
        retlw  0x03;
        retlw  0x04;

end
```

3) If the look up table in the above program is modified as follows, what do you expect to appear at PORTB when the program is run?

```
my_lookUP_table

        addwf  PCL, F;
        retlw  0x13;
        retlw  0xAA;
        retlw  0xFF;
        retlw  0x03;
        retlw  0x40;
```

4) What are the outputs of the following program at PORTB? Compute them without computer simulation.

```
LIST P=16F84A
INCLUDE "P16f84A.INC"

__config _CP_OFF&_WDT_OFF&_XT_OSC

bsf  STATUS, RP0;
clrf TRISB;
bcf  STATUS, RP0;
clrf PORTB;

main_part

        movlw  .3;
        call       my_lookUP_table;
        movwf  PORTB;

        nop;

        movlw  .1;
        call       my_lookUP_table;
        movwf  PORTB;

        nop;

        movlw  .6;
        call       my_lookUP_table;
        movwf  PORTB;

        nop;

        movlw  .0;
        call       my_lookUP_table;
        addlw    .1;
        movwf  PORTB;

        nop;

        movlw  .0;
        call       my_lookUP_table;
        movwf  PORTB;

loop goto loop

my_lookUP_table

        addwf   PCL, F;
        retlw    0xFF;
        retlw    0xBB;
        retlw    0xAB;
        retlw    "F";
        retlw    "A";
        retlw    "B"
        retlw    0x44;
        retlw    0x08;
        retlw    0x12;
end
```

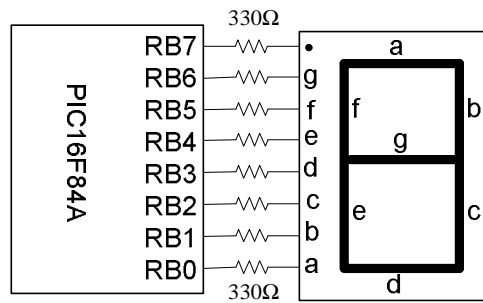5) The connection of PIC16F8 to Seven-Segment display is as shown below.

Figure 7.1 PIC16F84 and SS interface

Regarding the above figure, the table that shows PORTB values corresponding to the displayed values at SS is given below.

Table 7.1 PORTB Values and SS Displayed Numbers

PORTB Value	Displayed Number at SS
0x3F	0
0x06	1
0x5B	2
0x4F	3
0x66	4
0x6D	5
0x7D	6
0x07	7
0x7F	8
0x6F	9
0x77	A
0x7C	B
0x39	C
0x5E	D
0x79	E
0x71	F
0x80	•

Using the above table, write an assembly program that displays the digits 0-9 at SS with 0.8 sec delays.

6) Write a program that displays digits 0-2-6-8 repeatedly at SS with 0.8 sec delays.

Laboratory Work:

1) Trace program segments in preparation 1-4 and comment on the results.
2) Compile and obtain hex files of programs you wrote in preparation 5 and 6, program your PIC experiment card and see the results on experiment card. Comment on the results.

During your LAB work show every step that you complete to the LAB assistant. Get a copy of assembly files you write during the LAB hour via a flash disk for future reference.