

**ECE 425 Introductions to Microprocessors  
Laboratory Work 11**

**Objective:**

- 1) Indirect Addressing Using INDF and FSR Registers.
- 2) Data and EEPROM Memory.

**Preparation:**

Indirect addressing uses the registers INDF and FSR. The register INDF is used to load to something to a register whose address is contained in the register FSR.

- 1) Simulate the following program step by step using F7. Note the value appearing at PORTB and comment on the values appearing at PORTB.

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

__config __CP_OFF&_WDT_OFF&_XT_OSC

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

movlw    0x10;
movwf    0x0C; 0x10 is written to the memory location 0xC0
movlw    0x20;
movwf    0x0D; 0x0A is written to the memory location 0xC1

movlw    0x0C;
movwf    FSR; The register FSR contains 0x0C
movf     INDF, W;
movwf    PORTB;

incf     FSR,F; The register FSR contains 0x0D
movf     INDF, W;
movwf    PORTB;

end
```

2) The following program fills the memory locations 0x0C...0x1C with 0xAA. Simulate the program using F7 and understand the use of FSR and INDF registers.

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

__config __CP_OFF&__WDT_OFF&__XT_OSC

    movlw 0x0C;
    movwf FSR;

loop
    movlw 0xAA;
    movwf INDF;
    incf   FSR, F;

    movlw 0x1D;
    subwf  FSR, W;
    btfss  STATUS, Z;
goto loop;

nop;
nop;

end
```

3) Write a program that fills the memory locations 0x0C...0x2C with integers 1, 2, 3,.....

4) Assume that memory locations 0x0C...0x1D contains integers. Write a program that reads memory locations 0x0C...0x1D in a sequential manner and checks the content of the memory locations. If the memory address contains a value greater than 0x15 the value of the address is displayed at PORTB.

5) Write a program that reads 23 eight-bit integer from PORTA one by one and writes them to memory locations whose starting address is 0x0C.

6) The EEPROM memory locations can be read or written using the registers EECON1, EECON2, EEADR, EEDATA. Write the contents of these registers, and explain the function of each bit of each register.

### Laboratory Work:

- 1) Trace program segments in preparation 1-2 and comment on the results.
- 2) Trace program segments you wrote in preparation 3-6 and 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.**