LAB # 5

INTERFACING A SEVEN-SEGMENT DISPLAY TO THE PIC18F4321 USING PIC18F ASSEMBLY AND PROGRAMMED I/O

1. **Title:** Design and implement hardware and software (PIC18F assembly-program) for inputting a 4-bit number entered via DIP Switches and display the result (0-9) on a Seven-Segment Display.

2. **Objective:**
   The purpose of this lab is to build hardware and write a PIC18F assembly language program for displaying aBCD number (0-9) on a common cathode seven-segment display based on four DIP switch inputs.

3. **Prelab:**

   The PIC18F4321 microcontroller is required to input a BCD number (0-9) via four switches connected to bits 0 through 3 of PORTA, and then output the BCD digit to a common-anode seven segment display connected to bits 0 through 6 of PORTB. Write a PIC18F at address 0x70 to accomplish this by storing seven-segment codes in data memory starting at address 0x100. The figure for the lab is provided below:
4. **Equipment, Software, and Components required:**
   - Microchip’s MPLAB C18 Compiler/Debugger
   - Parts List
     - PICKit3 and PIC18F4321 chip from Microchip
     - DIP Switches, Seven-segment Display, and a push button
     - Breadboard
     - Resistors
     - Power Supply

5. **Description (corresponding topics covered in the textbook):**
   - Section 8.2.4 (Pages 215-216), Problem 8.12 (Page 229), Appendix F, Appendix H

6. **Prerequisites:**
   - Example 8.3 (Pages 218-220)

7. **Procedure:**
   - Assemble the PIC18F assembly language program using the MPLAB.
   - Download the assembled program into the PIC18F4321 on the breadboard from your Personal Computer or Laptop using the PICKit3™ and MPLAB following the steps provided in Appendix H of the book.
- Use the default clock of the PIC18F4321 and connect the appropriate
  RESET circuit to the PIC18F4321 MCLR pin.

- Connect the DIP switches to port A and the seven-segment display to port
  B, and demonstrate the lab as a PIC18F4321-based stand-alone system.

8. Deliverables:

i) Postlab
   Write a C language program to write the program for the prelab except that the program will input a number from 0 to 15 at PORTA, and output to the single seven-segment display using standard symbols for 10 through 15.

ii) Lab report
   - Submit a final Lab report (Staple Signed prelab, postlab, and the schematic (if any) using Word, p-spice, Wordpro or other software tools, at the end of the quarter or semester).

9. Concluding remarks:
   - Complete each prelab before coming to the lab. Please get it signed.