I. Objectives

- To learn to interface 8051 with LCD display.
- To implement a look up table (LUT)

II. Materials

- Keil uVision3 development environment.
- 8051 hardware development kit (MDE-8051)
- Jumper kit
- OPTREX DMC-20481 LCD display
- Resistors

III. Procedures

Part 1 (Week 1)

1. Connect trainer board with DMC-20481 as shown in the following figure. (IMPORTANT: Be careful with the power supply and connections. Wrong connection might damage the LCD display or the trainer board.)

2. Based on the sample program 12-2 (p. 355), write a program to display “ELEG3923” in the middle of the first line, and your first name in the middle of the second line. (IMPORTANT: the 8051 port pins used for RS, RW, and E are different from the textbook, so you need to make modifications in the program accordingly). Character location can be found in Table 12-3 (p. 357). The specific requirements are given as follows

   (1) Use BIT directive to define the pins P3.2, P3.3, P3.4 as RW, RW,
and E respectively

(2) The strings: “ELEG3923” and your name must be stored in a ROM location, and access those contents with a loop and DPTR register.

(3) Use a switch to control the display. If the switch is ON, display only your name; if the switch is OFF, display only “ELEG3923”. (Hint: you can clear the screen by writing “#01H” to the command register of the LCD display).

3. Display “Go Razorbacks!” in the middle of the LCD screen. Continuously scroll the string from left to right.

Part 2 (Week 2)

1. Connect switches 5, 6, 7 to P2.0, P2.1, P2.2 respectively

2. Constantly monitoring the combination of the three switches. Display the corresponding decimal value (‘0’ ~ ‘7’) in the first character of the first line in the display. Specific requirements are as follows
   (1) Use LUT to store the ASCII code of the decimal values
   (2) After reading the value from the switch, compare it with the value read in the previous round. If they are the same, do nothing; if they are different, update the display. (use the instruction CJNE)