ENGR-355
Lab 3

The I/O board you have assembled has a two line, 8 characters per line, LCD display. The goal of this lab is to create two functions useful for displaying information on the LCD display and also a main routine that will call these functions to demonstrate operation. A set of low-level functions that send data or commands to an LCD display are provided for your use in a C source file named lcd_lib_4bit_20b.c (found on the class web page).

Do the following:

1) Write a function (in C) that converts a 16-bit binary number into four hexadecimal digits. Input to this function will be a 32 bit integer but only the lower 16 bits need to be converted. A step-by-step sequence to learn out how to do this is:
   a) Accept as input a 32-bit integer with a value from 0 to 9 in it, convert to ASCII 0 to 9, and display by calling the lcd_data function.
   b) Modify your function to use a value from 0 to 15 and convert to ASCII 0 to 9 or A to F to create a hexadecimal digit. Display by calling the lcd_data function.
   c) Expand your function to convert 16 bits to 4 hexadecimal digits as ASCII characters. Either display with multiple calls to lcd_data or put the 4 characters into a character string and then display with the function described in (2) below.

2) Create a "display_string" function that will accept a string of characters and display them on the LCD display.

3) In a Lab3 main file use your functions to display a number on the LCD display and also a string of text.

4) Turn in to D2L a copy of your source file(s) for (3) above which should include your binary_to_hex function and display_string function. Make sure that at the top of your source file(s) the "heading" section is filled in with file name, your name, etc. Also in this section comment on the outcome of your lab, i.e. do the functions work as desired or if not describe the symptoms.

The LCD lcd_lib_4bit_20b.c file (available on the class web page) contains 3 functions that can be used to manipulate the LCD display:

a) lcd_init - call this function before the others to initialize the display
b) lcd_data - call to write one character on the lcd screen.
c) lcd_command - call to send a commend to the lcd display.

I created an example program named lcd_4bit_demo.c that demonstrates the use of my LCD functions. Download it from the class webpage and tryout it. As you create your own programs keep in mind that every program or function file you submit must have a header at the top defining what the program is, who wrote it, when, etc. See the software expectations handout on the class web page.

Cursor moving commands: clear_screen 0x01
move cursor left one position 0x10
move cursor right one position 0x14
move cursor to line 1 0x80
move cursor to line 2 0xC0