

CMPE1250 – LCD Control Functions

In this assignment, you will complete more LCD library functions and write a test program to validate their functionality.

- Using the LCD datasheet, complete the following functions, as prototyped in the sample header:

- `lcd_Addr`
- `lcd_AddrXY`
- `lcd_Clear`
- `lcd_Home`
- `lcd_DispControl`

With the exception on `lcd_AddrXY`, these functions correspond directly to an LCD command found in the datasheet. The `lcd_AddrXY` function will calculate the target device address from the supplied coordinates and call the `lcd_Addr` function.

The `lcd_DispControl` function will allow setting of cursor visibility and blink state. You may be asked to use all four combinations this function offers for cursor state. Make sure you test and understand what each of the four states look like on the LCD.

Don't forget that these functions need to use `lcd_Busy` to ensure that the LCD is ready to accept a command.

Begin with the cursor visible, but not blinking at address 0.

The user will be able to 'steer' the cursor around the LCD using the up, left, right, and down switches, on transition. Ensure the cursor stays within the bounds of the LCD X/Y addresses without wrapping or going out-of-range.

Pulse the red LED HIGH for 50ms if the user attempts to move the cursor out-of-bounds.

If the user clicks (transitions) the center button, you will deposit a random character in the range of 'A' to 'Z' inclusive. If the timer is initialized, you may use TCNT to generate random numbers, or `rand()` found in `<stdlib.h>`.

Display the number of deposited characters on the upper line of the 7-segs in decimal. If the number of characters deposited is equal to 15, fully reset the program state (clear the display and go home).

Fully test your code to ensure that your program meets all the necessary requirements.