Winter 2025 ICA09 7-Segment Display – Basic Functions

Before you complete this assignment, ensure that you have fully understood the discussion notes for the 7-Segment display.

You have been given the library compilation unit for operation of the segs display:

- `Segs_Display` – this function lets you choose a different command byte pattern depending on the Segs_ModeOption parameter to setup interpretation of the data byte. Research this from the notes, or from the datasheet and implement this function. This function will allow absolute authority over individual segments, so you can make any combination of the seven segments + the dp, including a blank character.

- `Segs_Clear` – this function should clear the entire display. You will use eight calls to `Segs_Display` to achieve this. Consider using a looping expression to do this, not eight individual function calls! Add a call to `Segs_Clear` as the last line of `Segs_Init`, so that the display always starts out blank.

- `Segs_8H` – this function should place two digits on the display, starting at the specified address. The 8 stands for 8 bits, or two nibbles. One digit is a single nibble.

- `Segs_16H` – this is just a 16-bit version of `Segs_8H`. The only difference is the display argument is now four nibbles, and the output address will either target the first line (address 0), or the second line (address 4). More AND/shifting can isolate the nibbles you need.

Create a standard project, with all libraries, and properly included/enabled PLL.

Tier 1:

In the one-time-initializations section of you code, initialize the segs library, and display the following:

In the main loop, if the CTR button is being pushed, count up on the upper line in HEX. Count down on the lower line in HEX (0xFFFF-the upper line!). Use your `RTI_Delay_ms` function to inject a 100ms delay between counts. The display should remain as above, until the CTR button is pushed for the first time.

Tier 2:

Display an animated caret that will start in position 0. The animation of the caret will be driven by a 100ms blocking delay. After 4 passes of your main loop look for left or right switch presses. If the corresponding switch is found to be pushed, move the caret left or right, but keep it on the upper line.

Display, the number of times the caret has changed positions on the second line.

Tier 3:

Same as Tier 2, but only take switch action if a switch has been pushed 4 times.

Look at the demonstration videos to see the subtle and not-so-subtle differences in the behaviors of these different Tiers.