CMPE1250 – ICA #6, PLL Library and Proof of SPEED

Built a new library (compilation unit), according to the header *"Clock.h"* provided. You are required to provide an implementation to each function prototype.

- *Clock_Set24MHz():* Set clock to 24MHZ using PLL
- *Clock_Set20MHz()*: Set clock to 20MHZ using PLL
- *Clock_EnableOutput()*: Enable output specifying divider for it (1-4)
- *Clock_GetBusSpeed():* Get current BUS speed.
- *Clock_GetFactor():* Get base clock (8MHz) multiplier.

In this ICA, you will test that the PLL function is doing what it should be! You will compare the same code running under the default 8MHz, 20MHz, and 24MHz and should be able to measure the speed difference and compare it to your expectations.

Part 1

Create a new project that blinks the red LED every 100ms (use technology from previous activities to set this up with a blocking delay). Do not include the PLL call in this part, as we want to establish a baseline rate.

Use your AD2 to capture the output on pin 82 and validate that your code is generating an approximate 5Hz square wave. Remember, the blocking delay needs to run twice to create a full wave, so the period of the output wave is two times the blocking delay period (one half the frequency).

Part 2

Now enable the *Clock_Set20MHz()* call in the one-time initializations section and run the modified code.

Do the same for Clock_Set24MHz().

For both options, complete the following table:

	Bus Frequency	Blocking Delay Time	Frequency
Baseline	8 MHz	100ms	5 Hz
Expected	24 MHz	33.333ms	15Hz
Measured with AD2	24 MHz	33.333ms	15Hz
Expected	20 MHz	40ms	12.5Hz
Measured with AD2	20 MHz	40ms	12.5Hz

A faster bus rate means faster instruction execution! We can now cram more instructions in per unit of time, and that is good if we need to do a lot over a short period of time. In the next micro course, you probably will!

Include captures of WaveForms showing the 8MHz, 20MHz and 24MHz waveforms, with included cursors/measurements, as discussed in class.

What is the per iteration time of your blocking delay (provide answer/evidence in code comments)?

Is it possible to run the micro with a bus rate of 40MHz? Why would or wouldn't you do this?

Explain you results in your Panopto video submission.