Lab 4 Report
Topics and Questions

ECE341, University of Idaho

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The following apply only to the report for Lab 4:

- In the implementation section:

    - When discussing the variables used as counters for the button delay and the step delay, justify the type: did you declare the counter variables `unsigned int` or just `int`? Justify your decision.

    - Do your counter variables count up (from zero to the delay value), or do they count down (they are reset to delay value and terminate at zero)? Justify your decision.

    - How do you determine the delay period has expired? Do you check with the `<=` operator, `==`, `>=`, or something else? What might be an advantage of checking with `<=` (or `>=`) compared to checking with `==`?

- In the testing and verification section:

    - Make sure to include oscilloscope captures of the 1 ms timer interval and the button sample period. For each button combination, show the corresponding step delay (make sure the button sample period is also shown at least once).

- In a section of your choice:

    1. Describe the limitations of using the Timer1 peripheral. What is the longest period that can be measured? What is the shortest period that can be measured? Assume the timer clock source is the peripheral bus clock (FPB) at 10 MHz. Include the derivations for your solutions.

    2. How does the the period register (PRx) affect the accuracy (resolution) of the timer delay?

    3. Calculate the change in delay period if the period value written to PR1 changes by one. What is the percent error introduced by this change? Show your work and your derivation.

    4. What are the differences between how the core timer and software delay were used, and how the Timer 1 peripheral is used? Specifically, how accurate (consistent) is a sample period that uses the Timer 1 peripheral compared to a sample period that uses the core timer? Hint: think about the time it takes to execute software that is not part of the delay, how (when) the delay period is calculated.