Embedded Systems
LA8 (R7)

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Date: 7/5/2015

P1: (100 points)

Provide comments regarding execution times and benchmarking of toggle operations for Red and Green LED’s.

The actual measurement of the execution time from the execution graph is approximately 380 usec for each LED toggle Swi. On the other hand, the benchmark toggle operation is logging 71 and 81 cycles for the red and green led toggling respectively. Since the frequency is 8.192 MHz, this means that the logging is actually reporting about 10 usec which is much less than the actual execution time. The reason for that is the logging is reporting the toggling only, while the execution time is reporting the time taken by Swi overhead, context save/restore, function overhead, and the actual code in ledToggle.

What is the general advantage (if any) of using Swi's when implementing clock functions?

If we have a long clock function, we can break it into multiple threads by posting other Swi’s in the system that are lower priority than this Clock Swi. By doing this, we can avoid not meeting real-time in case of receiving an interrupt before multiple functions inside an ISR finish executing.