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ECE341

Lab2 Report

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| **Desired Delay** | **Measured Delay (Software)** | **Measured Dealy (Hardware)** |
| --- | --- | --- |
| 1ms | 1ms with occasional 1.025ms | 1ms with occasional 1.002ms |
| 10ms | 10ms with occasional 10.5ms | 10ms |
| 100ms | 100ms | 100ms with occasional 97.5ms |
| 1000ms | 1000ms with occasional 1012ms | 1000ms |

– Under what circumstances might you use the software-only delay instead of the hardware-assisted delay?

When you don’t have access to the core timer, when you need a delay longer than a minute and a half, and when you don’t need the delay to be incredibly precise.

– Conversely, when might you use the hardware-assisted delay over the software-only one?

Under normal circumstances, the hardware-assisted delay is preferred. When accuracy is of more importance, and when we have access to the core timer.

– What are the advantages and disadvantages with both types of delays?

The hardware-assisted delay is generally more accurate, doesn’t require reconfiguring if the processor speed were to change between machines, it's easier to use, but you constantly poll the core timer so it's hardware dependent.

The pure software delay is less accurate, requires reconfiguring if the processor speed were to change, keeps the processor stuck in a loop merely waiting and not doing anything else, but is usable without requiring a hardware resource such as a timer, and is simplistic disregarding configuring the constant required. It is also more portable because of its lack of a hardware dependency.

– Address the limitations of each delay: What is the smallest length of time you can delay with the two types of delays?

The smallest length of time you can delay with either of them is 1ms because of how the functions are structured to take integer milliseconds as an argument.

– What is the longest length of time you can delay for both types?

The pure software delay maxes out at 49.71 days. The hardware-assisted delay maxes out at 1.79 minutes.

– Describe potential method(s) that could be used to increase the maximum delay period for both the software-only and the hardware-assisted delay methods

To increase the maximum delay of the hardware-assisted delay, we could put instructions in the while() loop that could be any operation. So, each loop iteration would take longer, but the precision of the delay would be slightly decreased since we check the Core Timer at longer intervals.

Our software delay method’s maximum can be increased in the same fashion as the hardware-assisted delay by putting instructions in the while() loop, but we would have to reconfigure the COUNTS\_PER\_MS to count correctly. Also, we could nest loops instead of merely having a single one, which would extend the maximum delay.