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Lab 8: Self-Directed Learning

Topic: Embedded System Testing and Debugging

How it relates to the class: It has to do with embedded systems.

Resources used:
- https://www.linkedin.com/advice/0/what-some-best-practices-tools-debugging-testing-1e
- https://www.cranesvarsity.com/debugging-and-testing-in-embedded-systems/
- https://www.linkedin.com/pulse/8-powerful-debugging-techniques-embedded-systems/
- https://www.allaboutcircuits.com/technical-articles/debugging-embedded-systems-three-simple-steps-to-finding-bugs-quickly/
- ChatGPT

Summary of what I learned:

As mentioned in class, and from observation and experiences during college, we have very little opportunities to learn about testing and debugging embedded systems. I really wish we had more resources to learn about the topic. Unlike software, where it is easy to place breakpoints and go through variables, hardware is a little more complicated. While the goal is the same for both software and hardware, the paths to testing and debugging for both are different with some parallels.

The first thing I learned about this topic is the core reason to testing and debugging. A piece of hardware with bugs can have great effects. And sometimes they are not recoverable by a simple reboot. The second thing I learned is that there are constraints to testing hardware. Although simulators are helpful, real-time problems dealing with interrupts and direct memory access can be a nightmare. On the same note, it is important to know what tools to use when dealing with certain types of testing and debugging. Finally, I learned about the advantages of utilizing the simulation waveform. Since I built the circuit, I should know the correct output given a test data. By pulling in and reviewing signals via the waveform, I can trace back various signals starting from where the surface issue is first seen.

Testing and debugging are crucial to an embedded system design. Knowing how to test and debug is what makes an engineer great. Hopefully I can become a great engineer as I navigate these topics.