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Summary of Lab

We learned how to program a more complex state machine and how to implement events and transitions between states properly. We also learned how to schedule multiple events and use the same timers to implement it. Worked on the user interface and how to schedule updates to the display. We also had a very heavy use of the macros and structured datasets to keep the codebase organized and easy to maintain.

Approach to Lab

I approached the lab by writing the user interface code for the OLED display, while using dummy constant variables. After that was running properly, I started implementing the portions of the state machine: The setting selector change mechanism, setting values from the ADC, the main cooking loop, then the branch to the reset pending state, then the LED bar, and finally the alert state. Essentially, I began with the most fundamental operations (normal cook, cycling through modes), and built on top of these with features like the LED bar.

After the features were all working, I continued by optimizing the code and adding more organization (comments, extra macros, etc.).

Implementing the Lab

I think it went fine. I spent about 5 hours on it, with there being a lot of content. I liked how it looked more like a real use case compared to the previous labs. Everything was fairly straightforward, the most difficult part was likely figuring out scheduling with the tick. I wish the lab was split into multiple files, the single file is a bit unwieldy; I would have done so but I didn't want to mess up any grading.

For the ALERT functionality, I directed the COOKING state into a new ALERT state once the cooking time was up. All this state does is check for a button 4 down press (acknowledging the user has came back to pick up the food), and triggering updateOvenOLED() every 500ms (2Hz). In updateOvenOLED(), there is a section which uses OLED_Clear() to invert the display and immediately return whenever it senses the system is in ALERT. Thus, from a user's standpoint, the display starts blinking once cooking is done, and it will continue blinking until the user presses down button 4.

The lab was fine, grading was fine, very worthwhile and I am sure people learned a lot. Lab manual and examples during class covered the material in enough detail, I suppose.