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Real Time Systems Programming

Answer to Vending Machine Lab Question

1. Explain what you learned in this lab. What went wrong and what did you learn from your mistakes. Give specifics please.

Overall, I learnt I had a good grasp on the concepts taught in class and was able to complete the project without too much difficulty.

One problem that persisted is that my board would reset occasionally and I had no idea why, but once I started the Lab 5 Watchdog I realized that the Watchdog timer was enabled by default and I never knew. Once Lab5 was implemented this problem disappeared and the project functioned exactly as expected, with no unexpected resets.

Another problem I had was with vTaskTech, were I had a state machine which controlled the task's current functionality. Due to the nature of vTaskTech, which blocked at the beginning of the loop awaiting input from the UART2 Rx ISR, I had trouble figuring out how to update the mode upon exiting one state and entering another. Tthe GUI via UART terminal would not display new mode information once I switched states, and finally I implemented an updateMode() function which would send a "delete" character into the queue (which would clear the current user input) followed by a "enter" character in order for the code to branch into the if() statement containing the state machine and successfully update the GUI mode information.

After this, I discovered the possibilities available by sending data in a task to a queue in the same task, in order to unblock it and perform addition functions before re-blocking, and used similar techniques in other parts of my code.

Another issue was figuring out how to store a cash balance consisting of a float variable in NVM, which accepted either long or int variables. Finally, I went with multiplying the dollar value in float by 100 to create a value in cents, which could then be cast as an integer variable and be stored in NVM. Retrieval from NVM involved dividing this value by 100 in order to convert it from cents to dollars.

In the beginning of the lab my task diagram was different and had one less task, and different functionality for the vTaskPoll and vTaskUI, as well as one less queue. As the project started to take shape, I realized that this reduced task loadout wasn't adequate and had to expand and involve a queue from vTaskPoll to vTaskUI, which was modified to poll pushbuttons for user input as well.