E E 474 - Lab 3 Report

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Procedure:

- Task 1a helped familiarize us with the ADC module, using the ADC Handler and the PLL clock. We were given start code that implemented the PLL initialization. We set the frequency to 60 MHz for this task. Part of this task was also learning how to configure an ADC module. We were able to follow the instructions given to us in the sample code and refer to the datasheet to configure corresponding registers. We used the GPIO Port E to use PE3 to connect to ADC input 0. The timer was also set up to be triggered with ADC trigger. After setting all these modules up, the ADC value was obtained from the ADCSSFIFO. We used the ADC value to then calculate the resistance and based on the resistance value, the number of LEDs turned on was adjusted.

- Task 1b helped further familiarize us with the modules used above. This time, we used the ADC value to calculate the internal temperature. We also implemented 2 on board switches to switch between 120 MHz and 12 MHz with the use of Port J GPIO. The ADC registers are also configured to read internal temperature instead and no GPIO input is taken for the ADC. The temperature reading is then printed to terminal.

- Task 2a familiarized us with the UART serial communication. We implemented the same task as 1b but output the temperature to PuTTY. This was done by configuring the UART2 on top of the exisiting ADC setup. This was done using GPIO Port A6 and 7. The same setup was used to switch between frequencies using on board switches. We added a few extra steps to print to PuTTy for this task using UARTFR and UARTDR. We used a mask to check for the UARTFR value and when the UART was ready we got the data using UARTDR. The value was input with the help of a temporary array as well.

- For task 2b, we used UART and bluetooth to display the characters entered into the PuTTy terminal. We initialized the UART in the same way as before. The character entered in the terminal was read when the flag was 1. Once the character was read it was immediately printed by setting the data to the character when the flag is 1.

Results:

- Task1a shows us the number of on board LEDs turning on increases as we increase the resistance as seen in the demo video.

- Task 1b shows us the internal temperature of the board as measured by the ADC. We see that when we change the frequency of the clock using the on board switches, the temperature also changes in the output terminal by +/- 1 degree.

- Task 2a shows the same results as task 1b but in the PuTTy terminal.

- For task 2b, when we type a character into the PuTTy terminal, we see the character being displayed in the terminal.