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ECE5780/Lab 6 – Analog

1. What is hysteresis and how does it help prevent bad behavior on digital inputs?
    - Hysteresis changes the voltage threshold depending on the currently detected digital state. This makes it impossible for a signal to consistently hang around the trigger point.
2. What is quantization?
    - The flattening of the analog signal to make it representable in a certain number range. The more numbers you have the better the resolution of the result. As the number of bits to represent the voltage increases, the more steps there are, therefore the more accurate the actual analog value is at that given point in time.

3. What does Nyquist theory explain? What is the problem with sampling a signal too slowly?
    - In order to represent an input signal by sampling its value periodically, the sampling rate must be at least twice the frequency of the fastest signal. If it isn't then you'll either not be able to recognize the output at all, or you will have the higher-frequency signals "aliasing" and looking like a slower signal.

4. The maximum resolution of the ADC is 12-bits. How many quantization steps/values does this give us?
    - 4095

5. What are the steps to perform an ADC calibration?
    - Once the user triggers the calibration cycle by setting the appropriate bit, the ADC will clear that same bit when calibration is complete. So basically allow it to perform the calibration itself when it turns on.

6. Whats the difference between right and left-aligned data in the DAC registers?
    - Left-aligned mode is typically used for selecting the upper bits of a 16-bit number, allowing the DAC to act on 16-bit data without any conversion or shifting.
    - Right-aligned mode is used for the same reason, except that it uses selects the lower bits of the 16-bit n
7. What DAC register would you use to write 8-bit right-aligned data? (use the peripheral reference manual)
    - DAC_DHR8R1
8. Name something you found confusing or unclear in the lab manual.(If everything was clear, simply answer that you don't have any issues.)
    - Not being able to find the definition of Hysteresis at first was confusing until the lab was updated. Other than that it was fine.