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Prelab 06

1. What is hysteresis and how does it help prevent bad behavior on digital inputs?
   A type of voltage thresholding, it changes the voltage threshold depending on the detected digital state. It makes it impossible for a signal to consistently hang around the trigger point by moving the threshold up if the signal is in a low state or moving it down if the signal is high.

2. What is quantization?
   The process of mapping a high-resolution signal to a manageable lower-resolution one. Basically flattens pieces of an input signal to make it representable in a certain number range.

3. What does Nyquist theory explain? What is the problem with sampling a signal too slowly?
   Nyquist theory explains the relationship between how often an input signal should be sampled and whether or not the data is represented properly afterwards.
   Sampling too slow will decrease the accuracy of the representation of the signal. The best way to sample a signal is to sample at a rate that is at least twice as fast as the fastest signal.

4. The maximum resolution of the ADC is 12-bits. How many quantization steps/values does this give us?
   Since 8 bits equates to 256 steps, 12-bits is 4096

5. What are the steps to perform an ADC calibration?
   Calibration can only be performed when the peripheral is stopped.
   1. Ensure that ADEN = 0 and DMAEN = 0
   2. Set ADCAL = 1
   3. Wait until ADCAL = 0
   4. The calibration factor can be read from bits 6:0 of ADC_DR

6. What's the difference between right and left-aligned data in the DAC registers?
   The left is used for selecting the upper bits of a 16-bit number. The DAC can act on 16-bit data without any conversion or shifting this way.

7. What DAC register would you use to write 8-bit to right-aligned data? (use the peripheral reference manual)
   DAC_DHR8Rx[7:0] bits
   DAC_DHRx[11:4] bits

8. Name something you found confusing or unclear in the lab manual. If everything was clear, simply answer that you didn't have any issues.
   Following intuition is how I got my answer for #4 but am not entirely sure that is correct. Does the number of bits correlate to the number of quantization steps given?