DEFINITIONS (4 points possible)

Please match the following terms with the letter of their appropriate definitions.

monotonic

precision

figure of merit

resolution

A. A combination of the number of bits in the ADC, how fast can we sample the ADC, and how much energy does it take to operate the ADC.

B. An ADC that has no missing codes as the analog input slowly rises.

C. The smallest distinguishable change in ADC input.

D. The number of different analog inputs that can be reliably measured by the ADC.

Check

ADC RESOLUTION (1 point possible)

An ADC has a range of 0 to 5V and needs a resolution of 10mV, how many bits are required? In other words what is the smallest number of ADC bits that would satisfy the requirements?

Check

DISTANCE MEASUREMENT (1 point possible)

An embedded system will use an ADC to measure a distance. The measurement system range is -10 to +10 cm and a resolution of 0.01 cm. What is the smallest number of ADC bits that can be used?

Check

ADC INPUT VOLTAGE (1 point possible)

The TM4C123 has a 0 to 3.3V 12-bit ADC. What will be the digital output of the ADC if the input voltage is 0.75 V? Give the answer in decimal.

Check

ADC INPUT VOLTAGE (1 point possible)

An 8-bit ADC (different from the TM4C123) has an input range of 0 to +10 volts and an output range of 0 to 255 (called straight binary). What digital value will be returned when an input of +7.5 volts is sampled?

Give your answer as a decmal number

Check

ADC SOFTWARE (1 point possible)

We first sample the ADC in the usual way. Let result be the 12-bit ADC sample.

Which of the following codes will set voltage to the equivalent value in mV? For example if the input is 1.234V then the software will set voltage equal to 1234.

- voltage=(result/4096)*3300;
- voltage=(result/3300)*4096;
- voltage=(result*3300)/4096;
- voltage=(result*4096)/3300;
- voltage=(result/4096)/3300;
- voltage=(result*4096)*3300;

Check

SAMPLING RATE (1 point possible)

An embedded system will use an ADC to measure sound. The range of sounds we to measure span from 100 Hz to 10 kHz.

What is the slowest rate at which we could sample the ADC and still have a faithful representation of the sound in the digital samples? Give your answer in Hz.

Check

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