AP Computer Science Principles
Ticket Out The Door
Set 8: Converting Analog Data to Binary

Name _____ Period _____

Skill 8.01 Exercise 1
Provide some examples of analog signals.

Skill 8.02 Exercise 1
Navigate to the wave on a string demonstration: https://phet.colorado.edu/sims/html/wave-on-a-string/latest/wave-on-a-string_en.html Set the simulator to “oscillate” and “no end”
What is a sufficient sampling rate for the default signal shown?
Use the slider to change frequency from 1.5 to 3 hz. What happens to the wavelength as you increase the frequency?
What is a sufficient sampling rate for a signal with a frequency of 3 hz?

Skill 8.03 Exercise 1
What is the relationship between quantization interval and the quality of the analog signal stored?
What limits the quantization interval?

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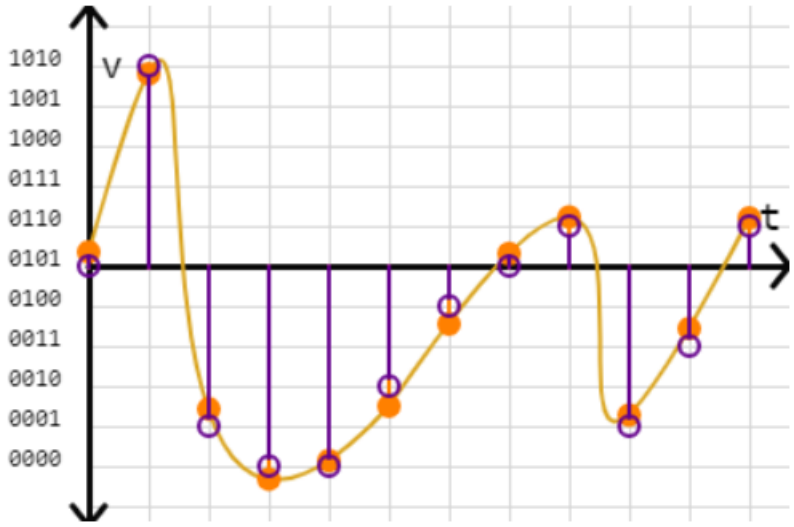
Skill 8.04 Exercise 1

Consider the signal below,



A quantization interval of 30 resulted in how many possible y values? How does the precision of the stored values change as the quantization interval is increased? Decreased?

How should the resulting binary sequence be encoded?

Skill 8.05 Exercise 1

Name two factors that effect the quality of a converted analog signal? How can these factors be changed to increase the quality?

Skill 8.06 Exercise 1

What is the advantage of analog signals over digital? Does music sound better when played on vinyl or CD? Why?