Wave file demos

For python 'wave' library, see:
https://docs.python.org/3/library/wave.html

For python 'pack' library see:
https://docs.python.org/3/library/struct.html

read_wavefile_01.m

In Matlab, reads 'cat' wav file.
Play signal, plot signal, illustrate quantization, FFT and plot.
Illustrates fftshift, FFT zero-padding

read_wavefile_02.py
read_wavefile_03.py

Open a wav file in python and read information.

write_sin_01.py

How many bits per sample ?
How many bits per second ?
What if maxAmp is higher than the value used in the demo? Or lower?
For stereo, how many bits per second are there?
What if 'h' is a different code ?
What if there are more than two channels?

read_sin_01.m

Plot the spectrum of the sinusoid. The peak in the spectrum better match the frequency of the sinusoid!

write_sin_02.py

Use python to generate a wav file with more bits per sample.
Verify that the spectrum has a peak at the prescribed frequency.
Verify that that the number of bits per sample is the prescribed value.

Activities for students (see assignment)

Use Matlab to read in sin_02_mono.wav
- Verify quantization size, is it as expected?
Solution: read_sin_02.m

Use Python to generate a WAV file of a sine wave at 8 bits per sample. (How do you do this?)
Solution: write_sin_03.py

Read your 8 bit/sample wav file into matlab
- verify quantization is as expected, verify spectrum,
- Is there any audible affect of the lower number of bits/second?
Solution: read_sin_03.m

Use Python to create a wave file of a sinusoid with a lower frequency, like 50 Hz.
How low can the frequency be before you can not hear it?
Solution: write_sin_04.py

Use python to create a wav file with more than two channels. Read the wave file into Matlab and plot the individual channels.
Solution: write_sin_05.py, read_sin_05.m

In a stereo wave file, how are the two channels of a stereo audio signal stored?

Use Python to create a wave file of a sinusoid using a higher sampling rate, like 16K 32K or 441,000 samples/second.