**MUSC 3264: Lab Assignment 3** (Due Tuesday, March 18, by 11:59pm)

Yellow highlights indicate the code you will need to write

*Recommended Workflow*

1. WRITE UP A plotAudioFunc() OF THE FUNCTION THAT ONLY CALLS plotAudio2()
   Run Cell 5 and then plotAudioFunc(sig,sr)

2. CREATE plotAudioFreqDomain() AS DESCRIBED IN STEP 3

3. ADD TO plotAudioFunc() SO THAT IT ALSO CALLS plotAudioFreqDomain()

*You are going to create two functions*

plotAudioFreqDomain() - *plots either a linear or log spectrogram (frequency domain) representation of an audio signal with a specified window size*

plotAudioFunc() – *calls* plotAudio2() to *plots the waveform (time domain) representation of an audio signal* and plotAudioFreqDomain() *either a linear or log spectrogram (frequency domain) representation of an audio signal with a specified window size*

1) In cell 1: the necessary libraries have been imported

2) In cell 2 copy plotAudio2() from Lab Assignment 2

3) In cell 3: create a function called plotAudioFreqDomain() that inputs
- an audio signal (sig)
- the audio signal's sampling rate (sr)
- the title for the plot (title)
- the window size of the spectrogram to be used for the n_fft argument when calling librosa.stft() (winSize)
- the type of spectrogram, 'linear' or 'log', to be used for the y_axis argument when calling librosa.display.specshow (specType)

and plots a spectrogram (frequency-domain) of the inputted audio signal
*use the code in frequencyDomain.ipynb as a guide for creating this function*

4) In cell 4 create a function that called plotAudioFunc() that inputs
- an audio signal (sig)
- the audio signal's sampling rate (sr)
- the title for the plot (title)
- the window size of the spectrogram (winSize)
- the type of spectrogram (specType)

The function will
- call plotAudio2()
- call plotAudioFreqDomain ()

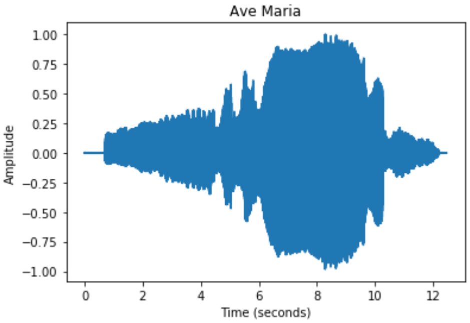
to plot waveform (time-domain) and spectrogram (frequency-domain) representations of the signal.

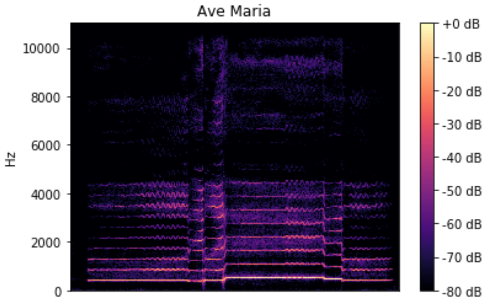
5) In cell 5 there is the code to open and play the audio file

6) In cell 6: call plotAudioFunc() with the following arguments

title = 'Ave Maria'<br>
winSize = 2048<br>
specType = 'linear'

This should generate the following plots

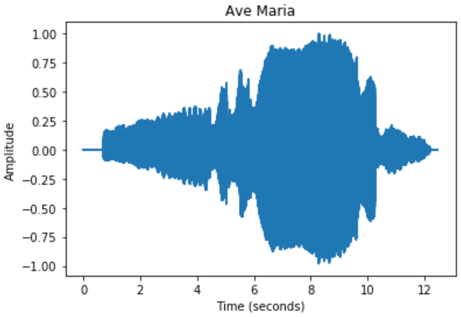


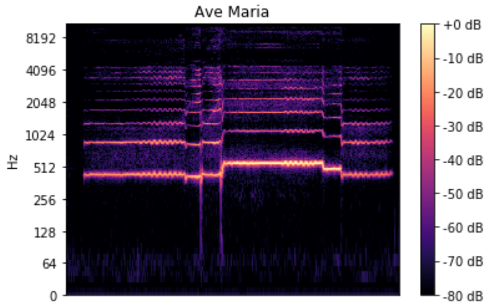


7) In cell 7: call plotAudioFunc() with the following arguments

title = 'Ave Maria'<br>
winSize = 2048<br>
specType = 'log'

This should generate the following plots

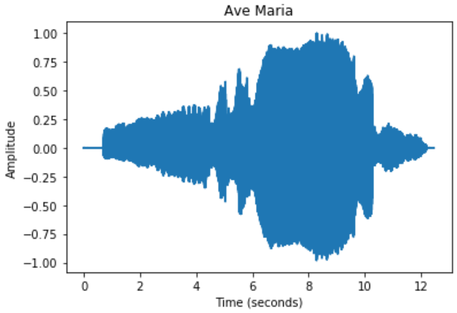


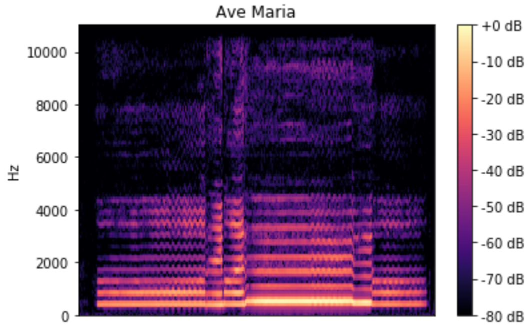


8) In cell 8: call plotAudioFunc() with the following arguments

title = 'Ave Maria'
winSize = 256
specType = 'linear'

This should generate the following plots

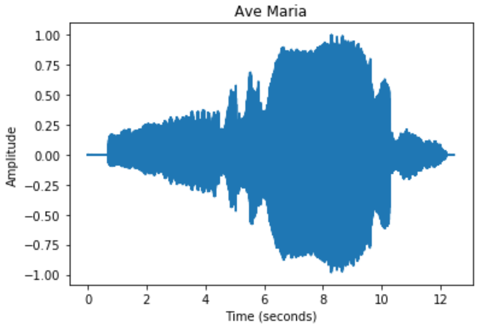


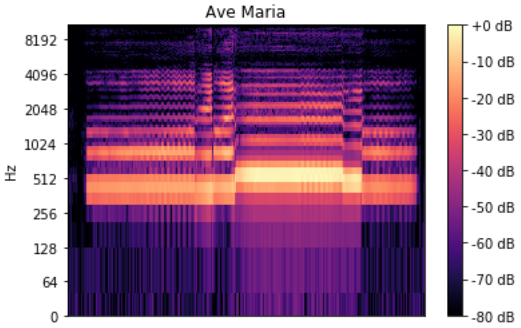


9) In cell 9: call plotAudioFunc() with the following arguments

title = 'Ave Maria'
winSize = 256
specType = 'log'

This should generate the following plots





**Suggested workflow**

1. Start with Step 4 “In cell 4 create a function that called plotAudioFunc()”

2. Write up a version of this function that only calls plotAudio2(), test it by running Cell 5 to load the audio and then plotAudioFunc(sig,sr)

3. Create *plotAudioFreqDomain() as described in Step 3*

4. Add to plotAudioFunc() so that it also calls plotAudioFreqDomain()
5. to plot waveform (time-domain) and spectrogram (frequency-domain) representations of the signal.