

MUS 6: Electronic Music

Section Lecture 3

Wednesday, October 21, 2020

Lecture Outline

1. Announcements
2. General Information
3. Music Intervals
4. Homework 1 (Ableton Live Basics)

Announcements

- Homework Assignment #1 is DUE by Friday, [Oct 23](#) at 11:59 pm

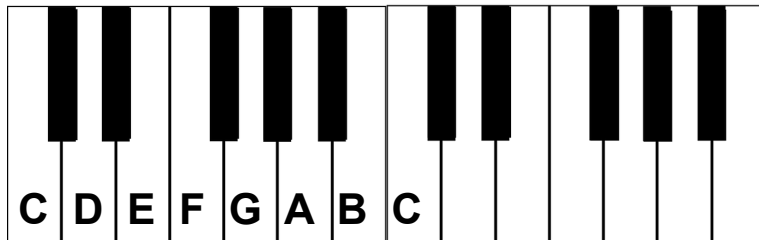
General Information: Student Question

- When I play the low E note on a guitar, I also hear a B note. Does the presence of the B note have something to do with the Fourier series?
 - Yes, it does! The B note you hear (246 Hz) is the 3rd harmonic of the fundamental frequency (82 Hz) of the low E string. That is, **$3 \times 82 \text{ Hz} = 246 \text{ Hz}$** .
 - From physics, we know that a guitar string vibration can be described using a Fourier series. For the low E string, the Fourier series is the sum of all appropriately weighted harmonics of the sine wave vibrating at 82 Hz. The B note at 246 Hz is the third member of this series.
 - Let's use the spectrum analyzer in Ableton to visualize this...

Music Intervals

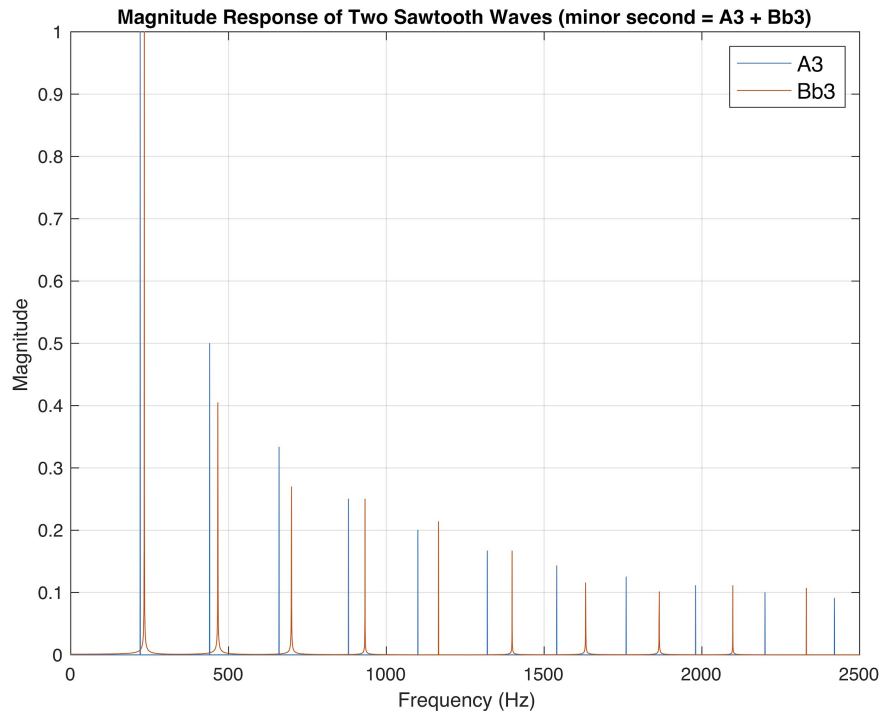
Music Intervals: Definition

- A music interval is **the difference in pitch between two musical tones**
- Pitch is a person's *subjective perception* of frequency. In this lecture, we'll consider pitch and frequency to be synonymous. However, in certain contexts, a person may perceive a different frequency from what is actually played. For example, a person could perceive two frequencies played at 1000 Hz and 1200 Hz as having a fundamental frequency of 200 Hz.



Music Intervals: Roughness

- **Audio Samples:**
<https://chadmckell.com/intervals>
- Some intervals sound more **rough** (unstable) than others. Roughness is caused by our ear's inability to distinguish between multiple tones.
- Several partials of the minor second interval played using two **sawtooth waves** lie close to each other (see plot). This can cause roughness.



Music Intervals: Roughness

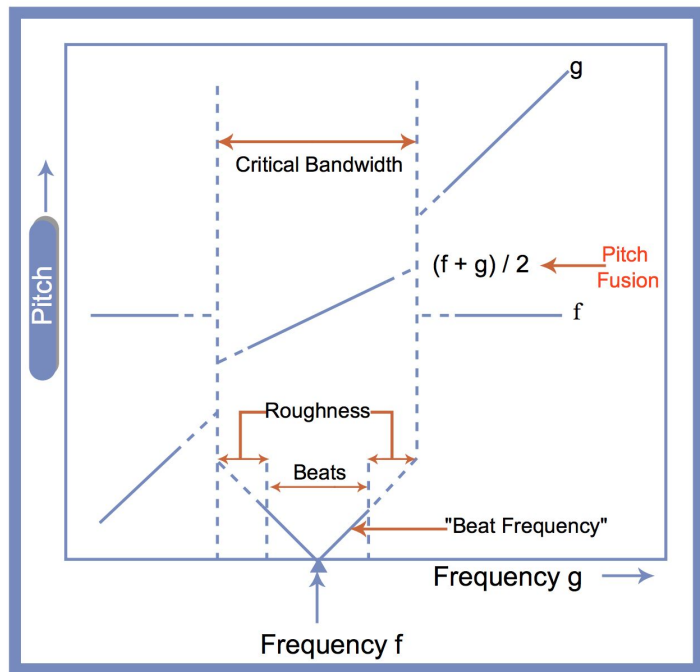


Figure by MIT OpenCourseWare.

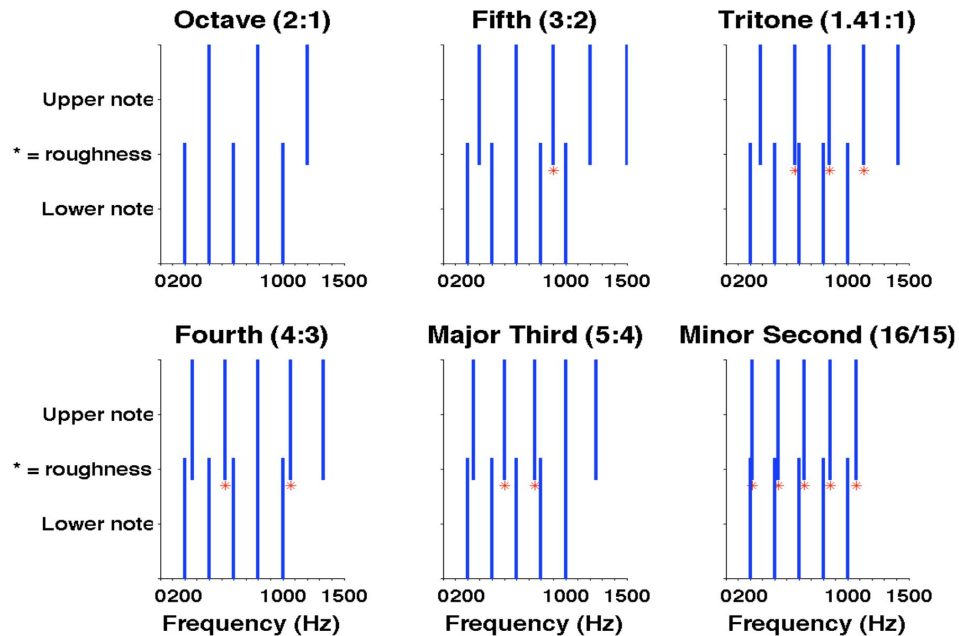


Figure by MIT OpenCourseWare.

Music Intervals: Consonance vs. dissonance

- **Consonant (stable)** intervals sound **less rough** while **dissonant (unstable)** intervals sound **more rough**. The table below shows some consonant intervals associated with “harmonic” instruments (e.g. Western classical).

CONSONANT INTERVALS							
Name of Interval	Octave	Fifth	Fourth	Major third	Minor third	Major sixth	Minor sixth
Notes (in Key of C Major)	C-C	C-G	C-F	C-E	E-G	C-A	E-C
Ideal Frequency Ratio	2	$3/2$	$4/3$	$5/4$	$6/5$	$5/3$	$8/5$
Number of Semitones	12	7	5	4	3	9	8

Figure by MIT OpenCourseWare.

Music Intervals: Dissonance graph

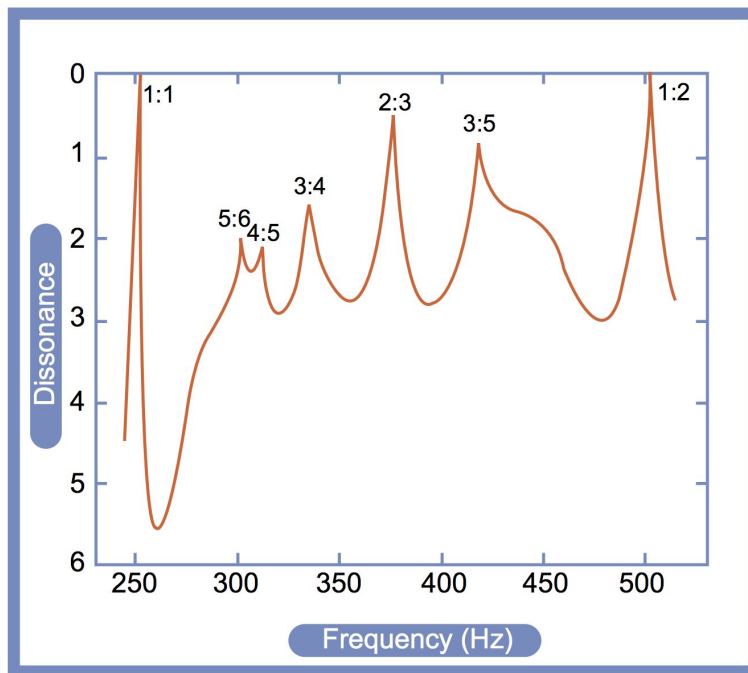


Figure by MIT OpenCourseWare.

Homework 1 (Ableton Live Basics)

Homework 1: Lecture schedule

- **Previous lectures:**

- Drum patterns
- MIDI data
- Audio samples
- Favorites bar
- Automation

- **Today:**

- Canvas submission guidelines (assignment + discussion)

Homework 1: Canvas Submission

- Submit your assignment in two places on Canvas:
 - Under “Assignments”
 - Under “Discussions”
- Include the following in your “Assignment” submission
 - Your audio file (it must be **at least one minute** in duration)
 - A short (2-3 sentence) description for each of the 5 bullet points
 - A screenshot for each of the 5 bullet points
 - A link to your Ableton project folder
- Include the following in your “Discussion” submission
 - Your audio file
 - A brief (2-3 sentence) description of your piece

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Assignments

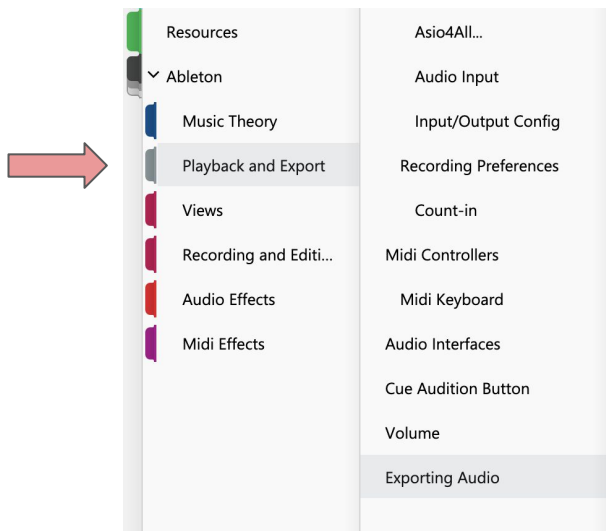


Discussions

Grades

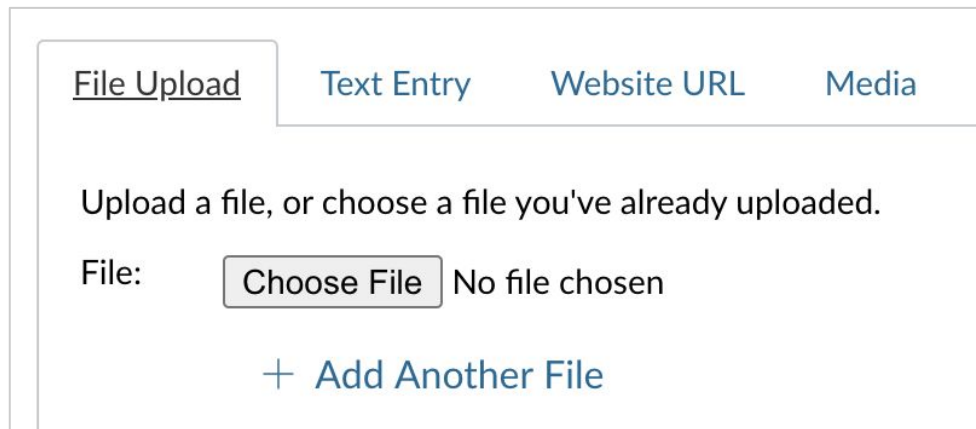
Homework 1: How to export your audio

- Guidelines for exporting your audio from Ableton are posted on OneNote under Playback and Export → Exporting Audio



Homework 1: How to upload your audio file

- Upload your audio file using the “File Upload” tab on Canvas.



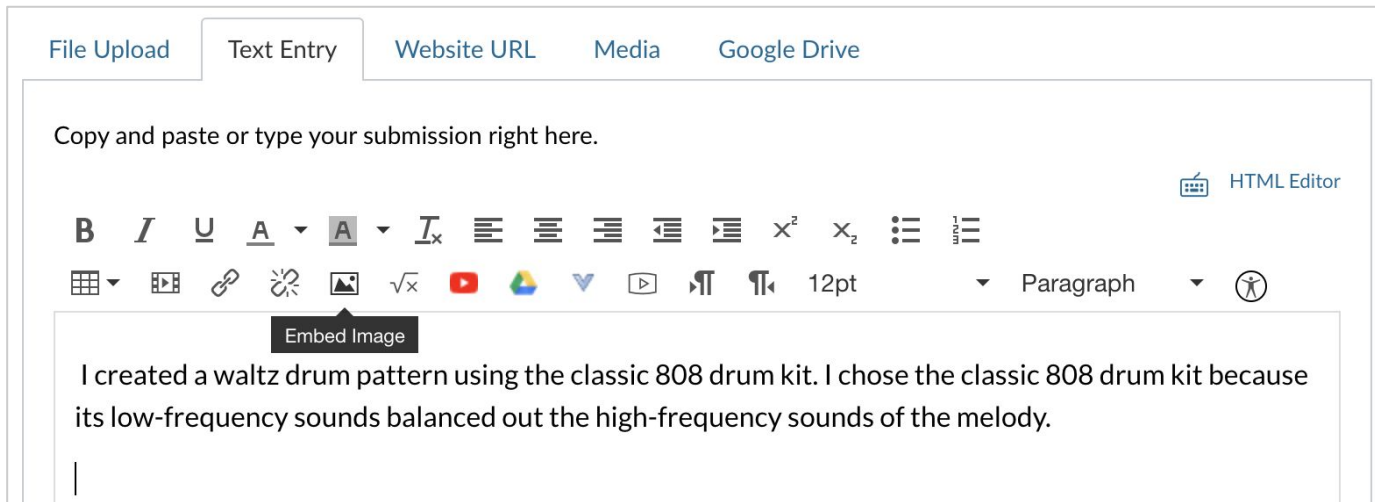
The image shows a screenshot of the Canvas LMS interface for uploading a file. At the top, there are four tabs: "File Upload" (which is selected and underlined), "Text Entry", "Website URL", and "Media". Below the tabs, the text "Upload a file, or choose a file you've already uploaded." is displayed. Underneath this text, the label "File:" is followed by a button labeled "Choose File" and the text "No file chosen". At the bottom of the interface, there is a blue plus icon followed by the text "Add Another File".

Homework 1: How to write the descriptions

- Add your descriptions in the “Text Entry” tab on Canvas.
- At the bare minimum, you should state what sound or pattern you used for each bulleted item. For example, in bullet point #1 (drum patterns), you could say that you created a waltz drum pattern using the classic 808 drum kit.
- You could also discuss any of the following for each bullet point:
 - Why you chose to use particular sounds or musical patterns
 - What stumbling blocks you ran into and how you overcame them
 - What you like about your piece
 - How you think your piece could be improved
- The description in your “discussion” submission could be a short summary of the descriptions from your “assignment” submission.

Homework 1: How to embed an image

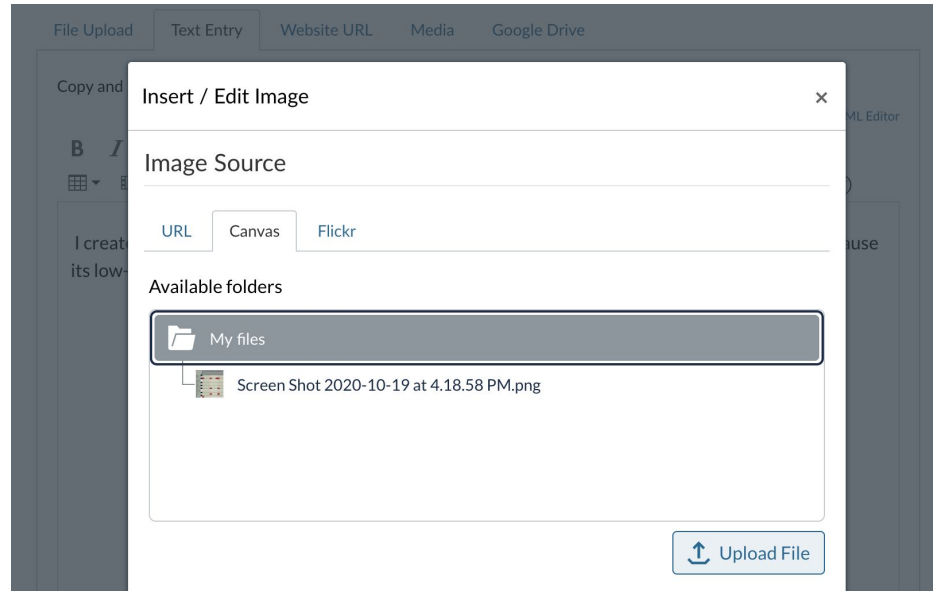
- First, click the “Embed Image” icon in the “Text Entry” tab on Canvas.



The screenshot displays the Canvas LMS interface for a 'Text Entry' submission. At the top, there are five tabs: 'File Upload', 'Text Entry' (which is selected), 'Website URL', 'Media', and 'Google Drive'. Below the tabs, a message reads 'Copy and paste or type your submission right here.' To the right of this message is a link for 'HTML Editor'. The main area contains a rich text editor toolbar with various icons for text formatting (bold, italic, underline, text color, background color, text size), alignment, list creation, and linking. The 'Embed Image' icon, which shows a picture of a mountain, is highlighted with a black tooltip that says 'Embed Image'. Below the toolbar, the submission text area contains the following text: 'I created a waltz drum pattern using the classic 808 drum kit. I chose the classic 808 drum kit because its low-frequency sounds balanced out the high-frequency sounds of the melody.' followed by a vertical cursor line.

Homework 1: How to embed an image

- Upload your screenshot to the “Canvas” tab. Then, click “Update”.



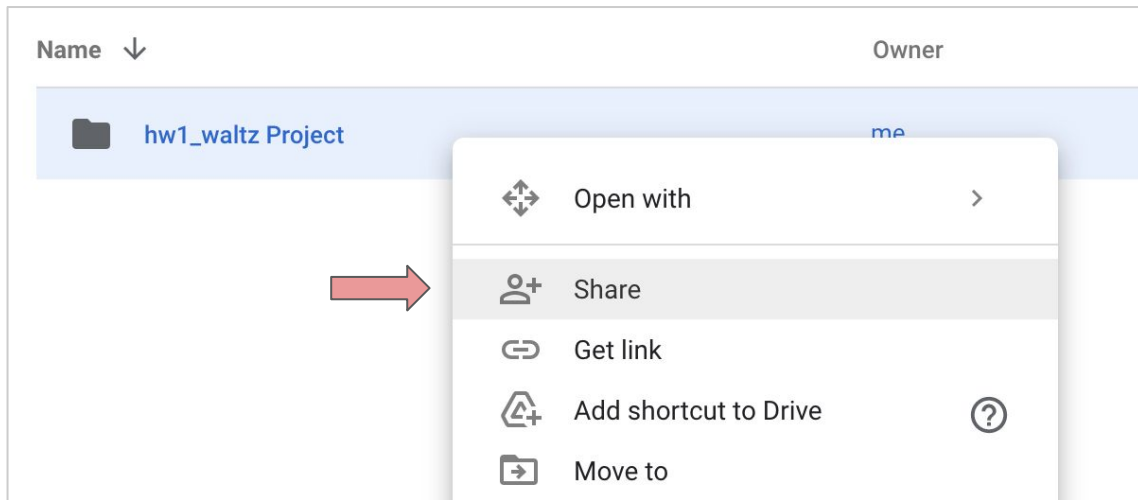
Homework 1: How to embed an image

- Your image should now appear in the text box with your descriptions.

I created a waltz drum pattern using the classic 808 drum kit. I chose the classic 808 drum kit because its low-frequency sounds balanced out the high-frequency sounds of the melody.

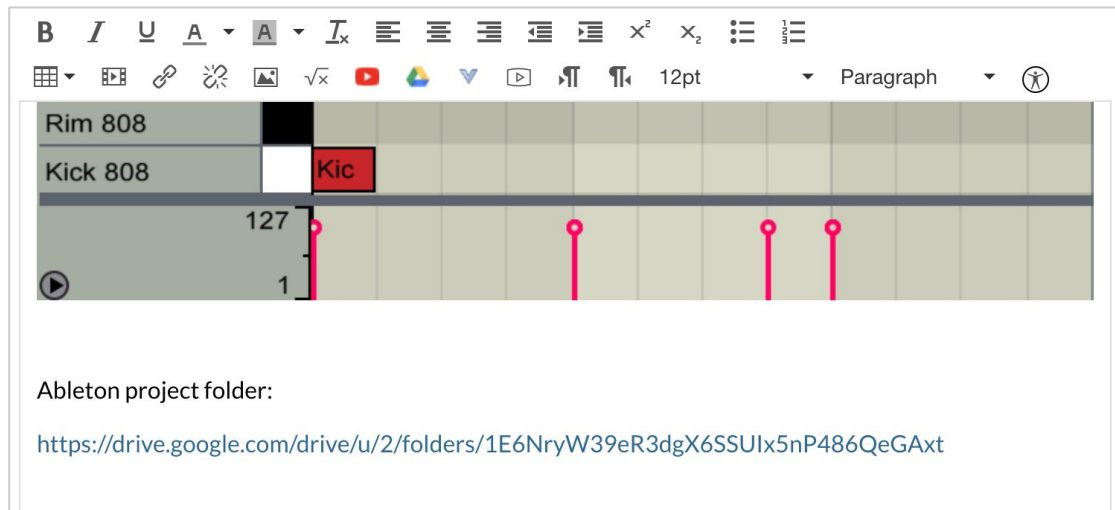
Homework 1: How to share your Ableton project

- Add your Ableton project folder to Google Drive
- Share your folder with your TA (my email is cmckell@ucsd.edu)



Homework 1: How to share your Ableton project

- Copy the URL for your Ableton project folder, then paste the URL in the text entry box (the same box you used for your descriptions and screenshots)



The screenshot shows a Google Docs interface. At the top is a rich text editor toolbar with various icons for bold, italic, underline, text color, background color, bulleted list, numbered list, indent, outdent, link, unlink, insert image, insert video, insert table, and font size. Below the toolbar is a table with two rows: 'Rim 808' and 'Kick 808'. The 'Kick 808' row has a red cell containing the text 'Kic'. Below the table is a timeline with a play button icon, a vertical line at 127, and four pink vertical lines. Below the timeline is a text entry box containing the text 'Ableton project folder:' and a URL: <https://drive.google.com/drive/u/2/folders/1E6NryW39eR3dgX6SSUIx5nP486QeGAxt>. A red arrow points to the text entry box.

Ableton project folder:

<https://drive.google.com/drive/u/2/folders/1E6NryW39eR3dgX6SSUIx5nP486QeGAxt>

Questions