

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

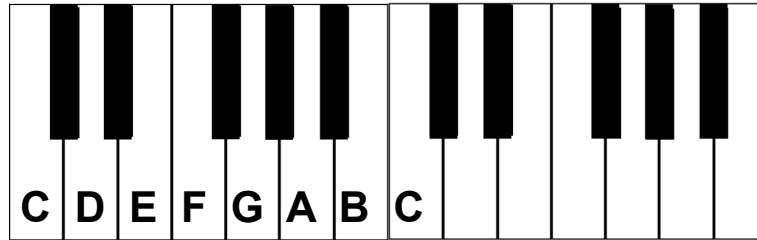
General Information: Student Question

- When I play the low E string 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

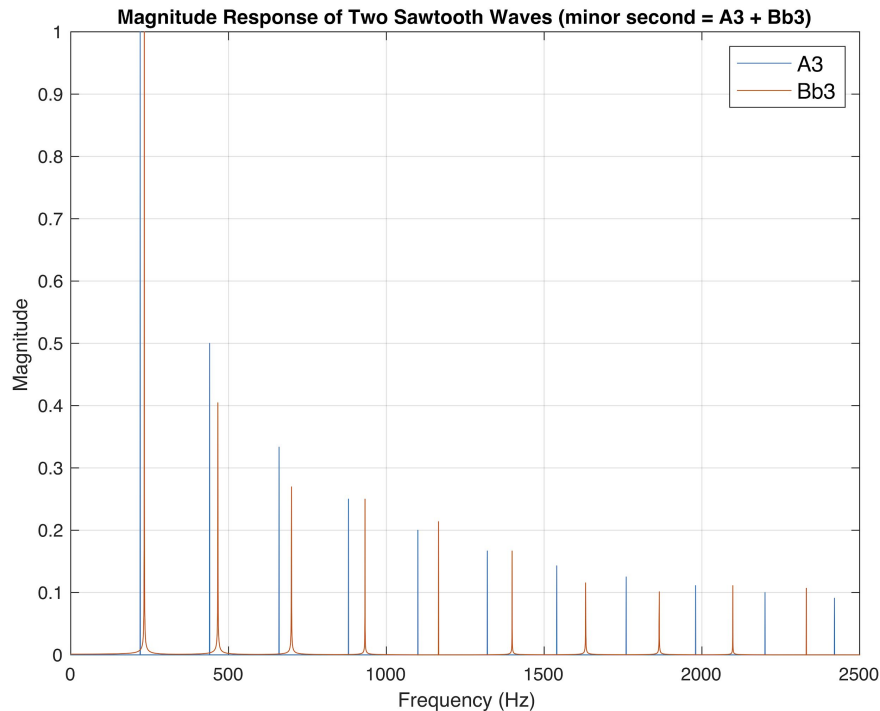
Music Intervals: Definition

- 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

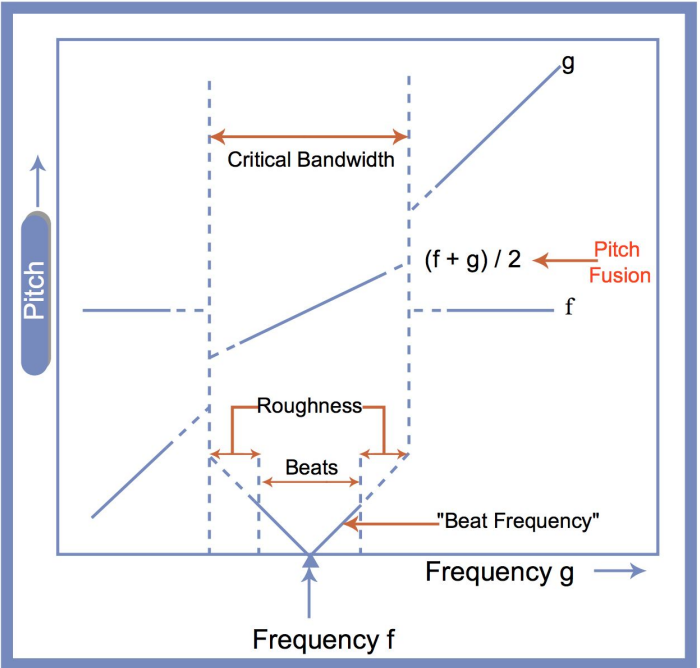


Figure by MIT OpenCourseWare.

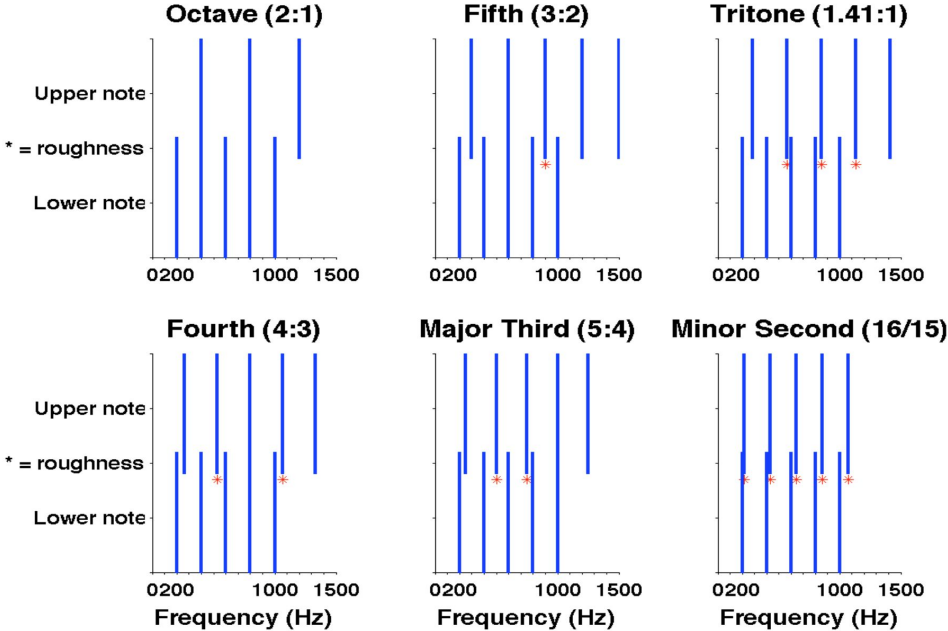


Figure by MIT OpenCourseWare.

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).

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

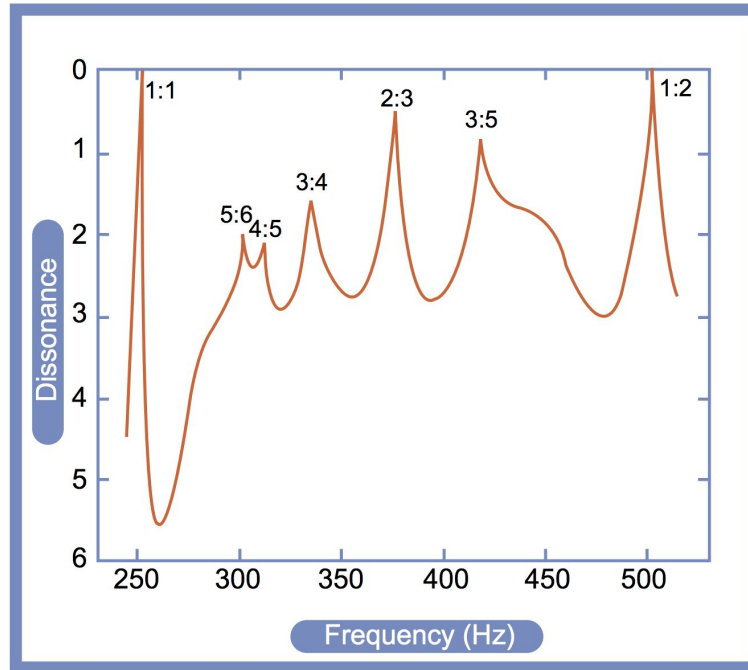


Figure by MIT OpenCourseWare.

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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Announcements



Assignments

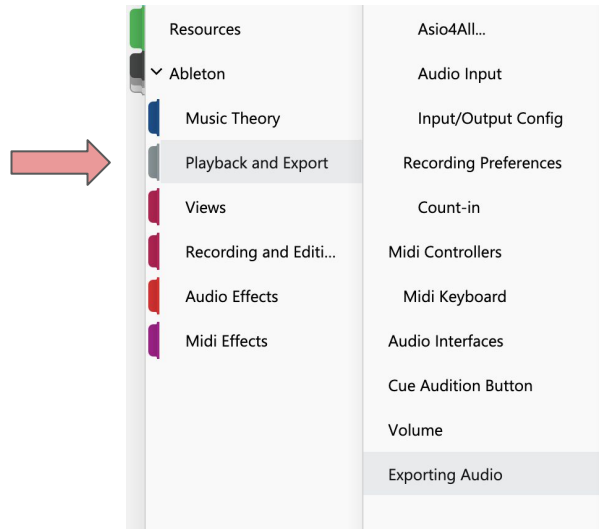


Discussions

Grades

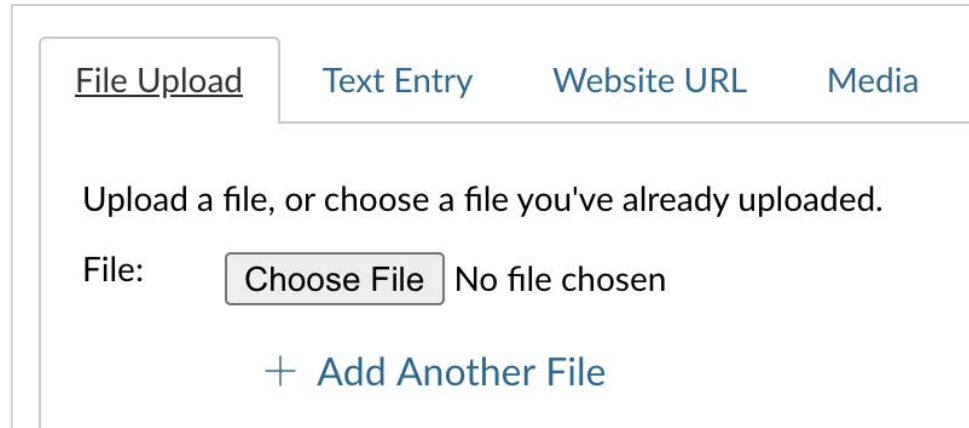
Homework 1: How to export your audio

- 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.



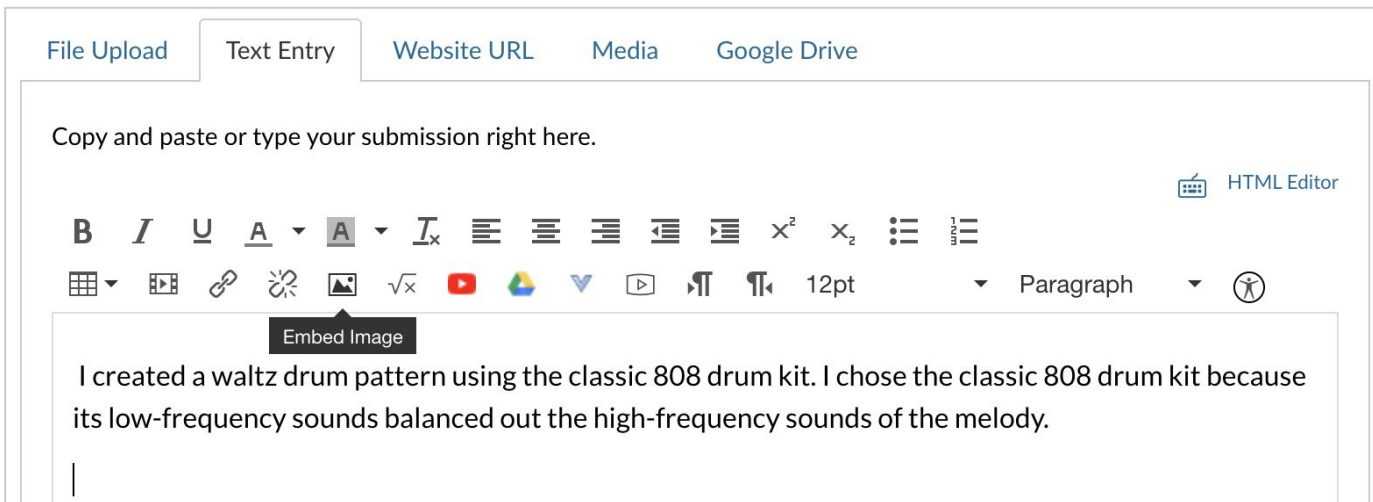
The image shows a screenshot of the Canvas File Upload interface. At the top, there are four tabs: "File Upload" (which is selected and underlined), "Text Entry", "Website URL", and "Media". Below the tabs, the text reads "Upload a file, or choose a file you've already uploaded." Underneath this, the word "File:" is followed by a button labeled "Choose File" and the text "No file chosen". At the bottom, there is a blue link that says "+ 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

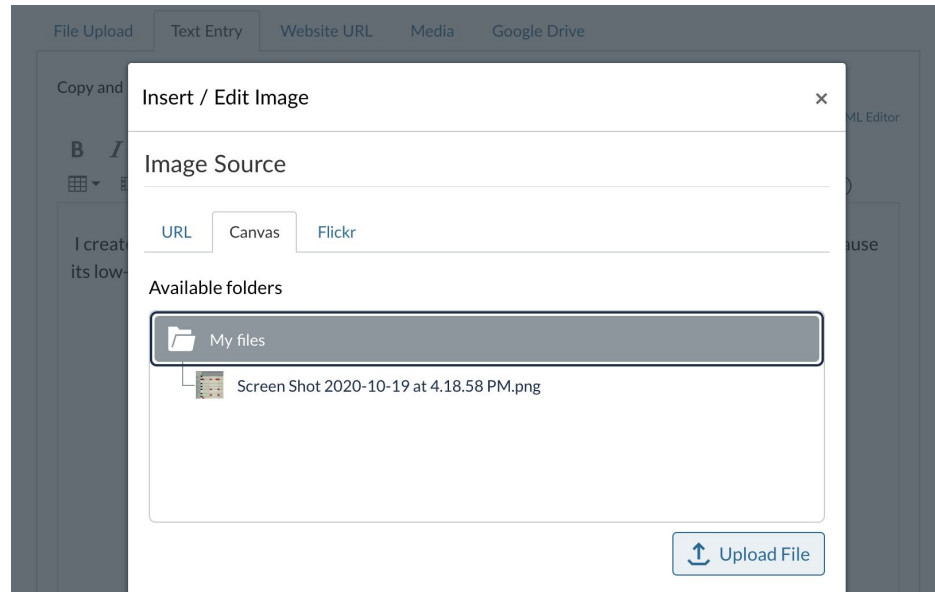
- First, click the “Embed Image” icon in the “Text Entry” tab on Canvas.



The screenshot shows the Canvas 'Text Entry' tab interface. At the top, there are navigation tabs: 'File Upload', 'Text Entry' (which is selected), 'Website URL', 'Media', and 'Google Drive'. Below the tabs, the main content area contains the instruction 'Copy and paste or type your submission right here.' and an 'HTML Editor' button. A rich text editor toolbar is visible, featuring various icons for text formatting (bold, italic, underline, text color, background color, strikethrough), alignment (left, center, right, justified), list creation (bulleted, numbered), and other functions like link, unlink, image, linkify, and root. The 'Embed Image' icon, which depicts a picture of a landscape, is highlighted with a black tooltip that says 'Embed Image'. Below the toolbar, the text entry 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.' A vertical cursor is positioned at the end of the text.

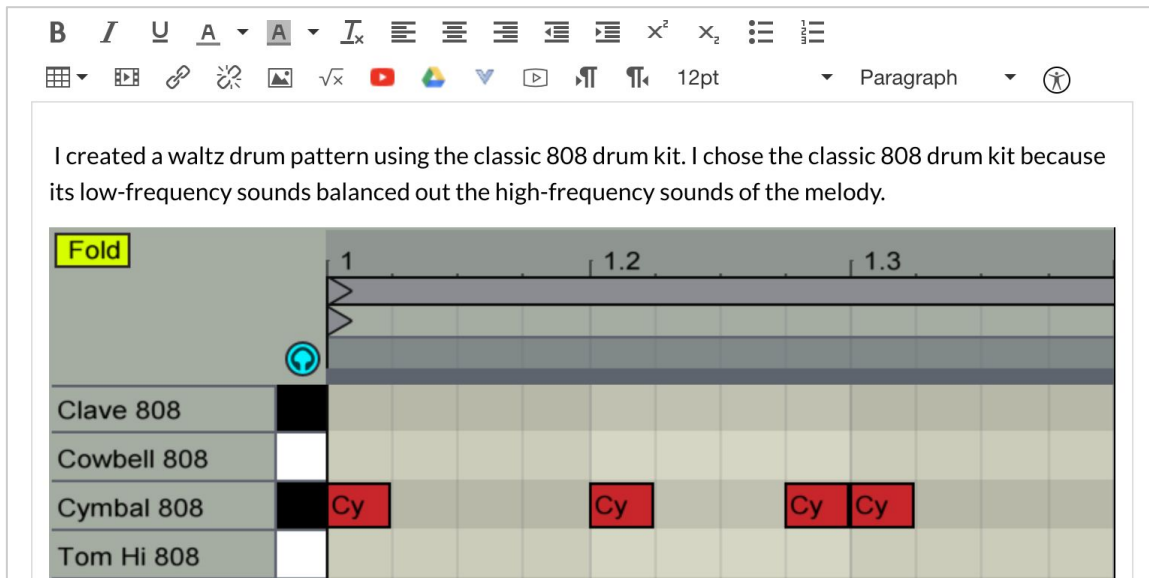
Homework 1: How to embed an image

- 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.

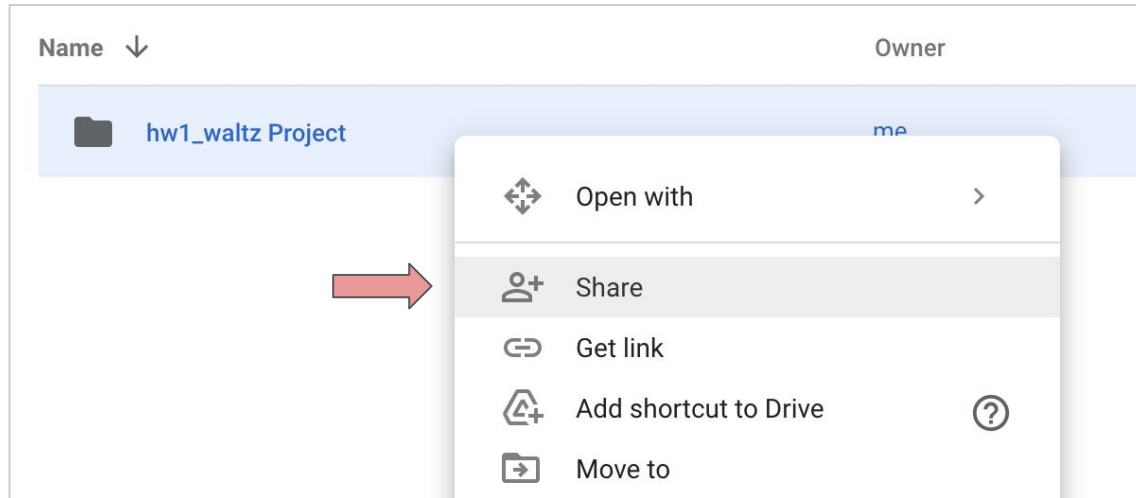
Fold

	1	1.2	1.3
Clave 808	■		
Cowbell 808	■		
Cymbal 808	Cy	Cy	Cy Cy
Tom Hi 808			

The image shows a screenshot of a rich text editor. At the top is a toolbar with various icons for text formatting (bold, italic, underline, text color, background color, link, unlink, image, link, unlink, video, audio, link, unlink), font size (12pt), and paragraph alignment (Paragraph). Below the toolbar is a text box containing the 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." Below the text is a drum pattern visualization. It features a "Fold" button in a yellow box on the left. The visualization is a grid with four rows representing different drum sounds: Clave 808, Cowbell 808, Cymbal 808, and Tom Hi 808. The columns are labeled 1, 1.2, and 1.3. The Clave 808 and Cowbell 808 rows have black blocks in column 1. The Cymbal 808 row has red blocks labeled "Cy" in columns 1, 1.2, and 1.3. The Tom Hi 808 row is empty.

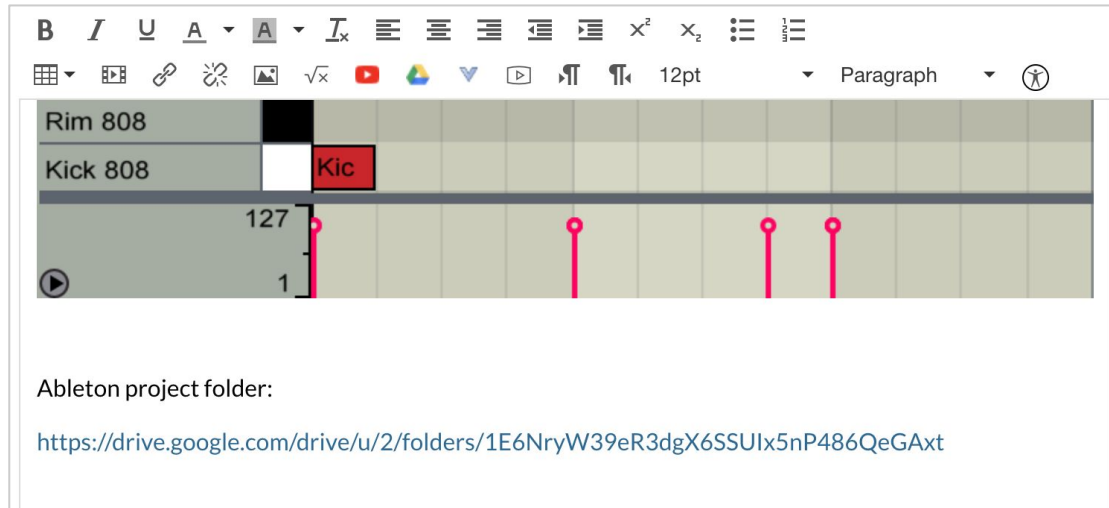
Homework 1: How to share your Ableton project

- 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 image shows a screenshot of a text editor interface. At the top, there is a rich text toolbar with various icons for bold, italic, underline, text color, background color, text alignment, list creation, and font size. Below the toolbar, there is a preview of an Ableton Live project's piano roll. The piano roll shows two tracks: 'Rim 808' and 'Kick 808'. The 'Kick 808' track has a red block labeled 'Kic' in the first cell. Below the piano roll, there is a play button icon and a '1' in a box. Below the piano roll, the text 'Ableton project folder:' is followed by a blue hyperlink: <https://drive.google.com/drive/u/2/folders/1E6NryW39eR3dgX6SSUIx5nP486QeGAxt>. A red arrow points from the left towards the URL.

Questions