MUSICAL PITCH I

Work on the RQ linked from the course webpage!

YU / LAMONT

JANUARY 30, 2018

UMASS AMHERST

GAMELAN!

Convert between notes and frequencies:

http://pages.mtu.edu/~suits/notefreqs.html

http://newt.phys.unsw.edu.au/music/note/

LEFTOVERS: PITCH VARIATION IN HUMAN LANGUAGE

http://www.ling197m.krisyu.org/pages/01/01-02_intro-ling-pitch-class.html

LANGUAGE FROM PITCH VARIATIONS

Exercise 1: Can you tell what language this is?

[10 minutes] Introduce yourself to one of your neighbors. As a team, come up with a guess about:

- Is your audio file a recording of American English? Why do you think so?
- If not, what language do you think it might be? Why do you think so?

- Audio files:
  - Apple
  - Banana
  - Coconut
  - Durian
  - Eggplant
  - Fig
  - Grapefruit
  - Halva

Maps of the world's languages:

http://www.languagesoftheworld.info/language-maps

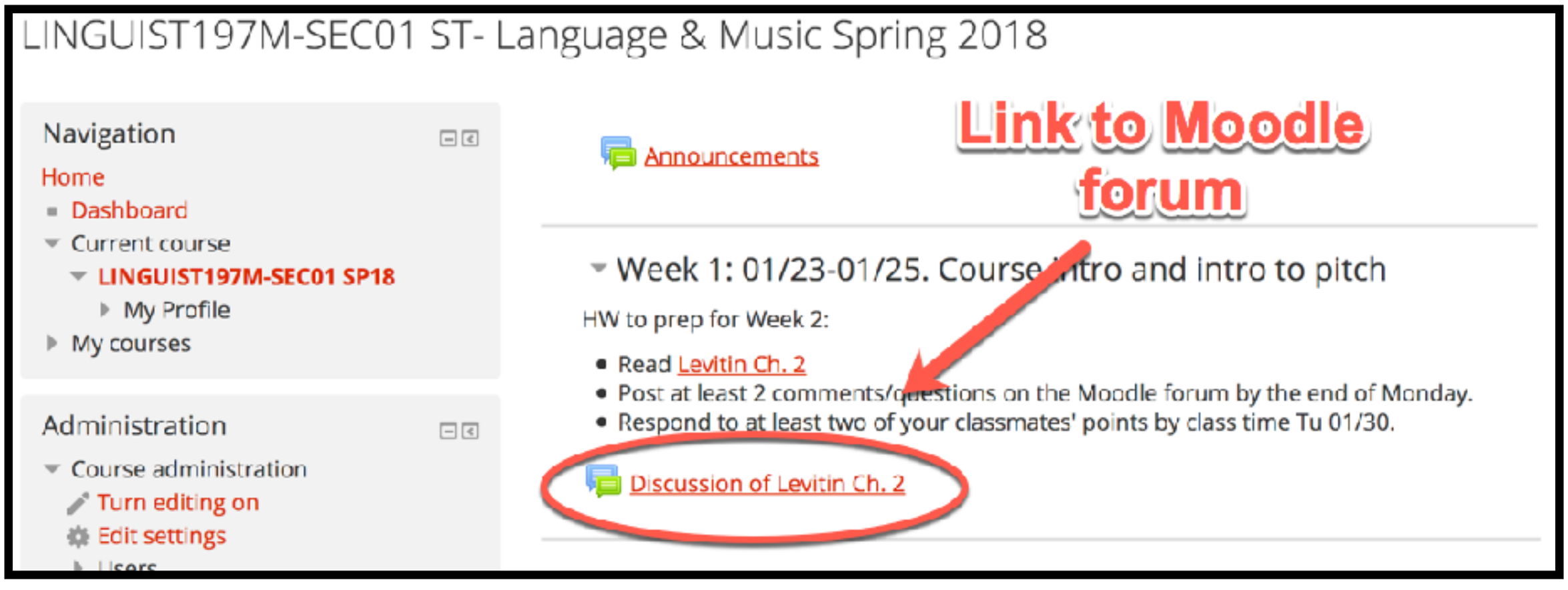
PITCH VARIATIONS IN THE WOMB

http://www.theshoppingduck.com/wp-content/uploads/2013/06/Sonogram.jpg?7a65ad

LEVITIN CH.2 DISCUSSION

HOMEWORK YOU DID FOR TODAY

- Read Levitin Ch. 2 (link provided in Moodle)
- Post at least 3 comments/questions on the Moodle forum by the end of Monday.
- Respond to at least two of your classmates' points by class time Tu 01/30.



SOME TERMINOLOGY: MORE THURSDAY

- sharp/flat
- tone/note
- whole step/tone
- overtone/harmonic <- Thursday

HE GOES ON TO TALK ABOUT HOW IF WE PUT ELECTRODES IN THE BRAIN ON THE COCHLEA, WE CAN KNOW WHAT PITCHES ARE BEING PLAYED BY ONLY LOOKING AT THEIR BRAIN ACTIVITY. I THINK THAT THIS IS REALLY AMAZING AND I AM VERY INTERESTED IN LEARNING MORE ABOUT THIS. FURTHER, I WOULD BE REALLY INTERESTED IN FINDING OUT IF WE CAN FIGURE OUT OTHER ATTRIBUTES OF A SOUND BY LOOKING AT BRAIN ACTIVITY. FOR EXAMPLE, COULD WE FIGURE OUT THE TIMBRE OR THE TEMPO OF A STRING OF SOUNDS BY USING ELECTRODES?

Megan

Tonotopic organization in the cochlea: https://www.youtube.com/watch?v=gd5nSKNaHZ8

...WE COULD DEFINITELY IDENTIFY THE TEMPO. THE MAIN PROBLEM WITH IDENTIFYING TIMBRE IS PROBABLY THAT NO TWO PEOPLE HEAR THE SAME SOUND IN THE SAME WAY, SO YOU WOULD HAVE TO CORRELATE EACH PERSON'S IMPRESSION OF THE SOUND TO THE PHYSICAL QUALITIES OF IT. BUT AS FOR TEMPO, USING AN ABR WE WOULD BE ABLE TO SEE WHEN THE BRAIN IS EXCITED BY EACH SOUND, AND SHOULD BE ABLE TO FIGURE OUT THE TEMPO FROM THERE

Melissa

Auditory brainstem response (ABR): https://www.youtube.com/watch?v=Ootx2ReYDVo

THE INNER EAR IS ARRANGED SO THAT HIGH FREQUENCIES ARE HEARD AT THE BASE OF THE INNER EAR AND LOW FREQUENCIES ARE HEARD AT THE END OF THE INNER EAR. ALL SOUNDS, WHETHER HIGH OR LOW FREQUENCY, NEED TO PASS THROUGH THE BASE. ALTHOUGH THESE CELLS MAY NOT BE RESPONDING TO THE LOW FREQUENCY SOUND, THEY ARE STILL BEING MOVED BY IT, WEARING THEM OUT OVER TIME.

Melissa

Hair cells: https://www.youtube.com/watch?v=K-cRIO4gQmk

I VIEW MUSIC AS A TIMELESS, FUNDAMENTAL ASPECT OF HUMAN CULTURE AND SOCIETY, BUT THIS DOESN'T MEAN THAT IT HAS STAYED THE SAME THROUGHOUT HISTORY. THIS IS CLEAR IN THE VAST ARRAY OF MUSIC FORMS FOUND ACROSS THE WORLD, BUT THIS TOPIC MAKES ME WONDER HOW MANY DIFFERENT INSTRUMENTS AND STYLES HAVE BEEN LOST THROUGHOUT THE YEARS OF HUMAN EXISTENCE BEFORE THEY WERE ABLE TO BE DOCUMENTED AND PRESERVED.

Emmett

. . . WHAT MIGHT HAPPEN IF RESEARCHERS PLAYED MAJOR AND MINOR SCALES FOR PEOPLE IN A SOCIETY WITHOUT MUSIC. WOULD THEY MAKE THE SAME ASSOCIATIONS AS WE DO?

Noelle

"Universal" musical form-function association paper: http://dx.doi.org/10.1016/j.cub.2017.12.042

"Universal" musical form-function association songs: https://osf.io/vcybz/

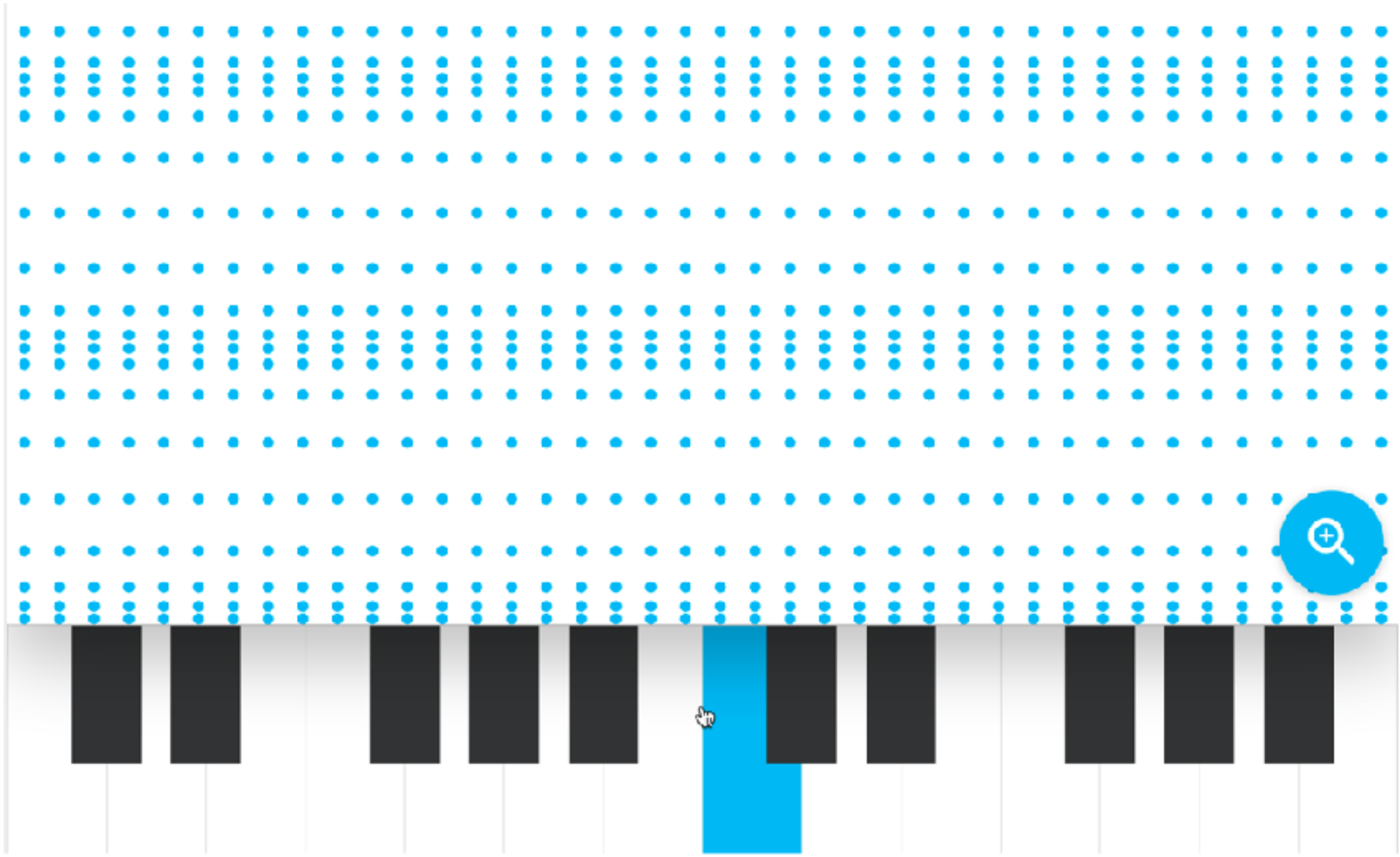
THE BRAIN WILL DO THIS WITH SPEECH SOUNDS AS WELL. STUDIES HAVE FOUND THAT THERE IS PERCEPTUAL EPENTHESIS WHEN PEOPLE HEAR AN ILLEGAL CONSONANT CLUSTER FOR THEIR LANGUAGE. OUR BRAINS WILL "REPAIR" THE SOUND BY INSERTING AN ILLUSORY VOWEL TO MAKE IT FIT THE SOUNDS WE ARE FAMILIAR WITH.

Reid

Missing fundamental: https://www.auditoryneuroscience.com/topics/missing-fundamental

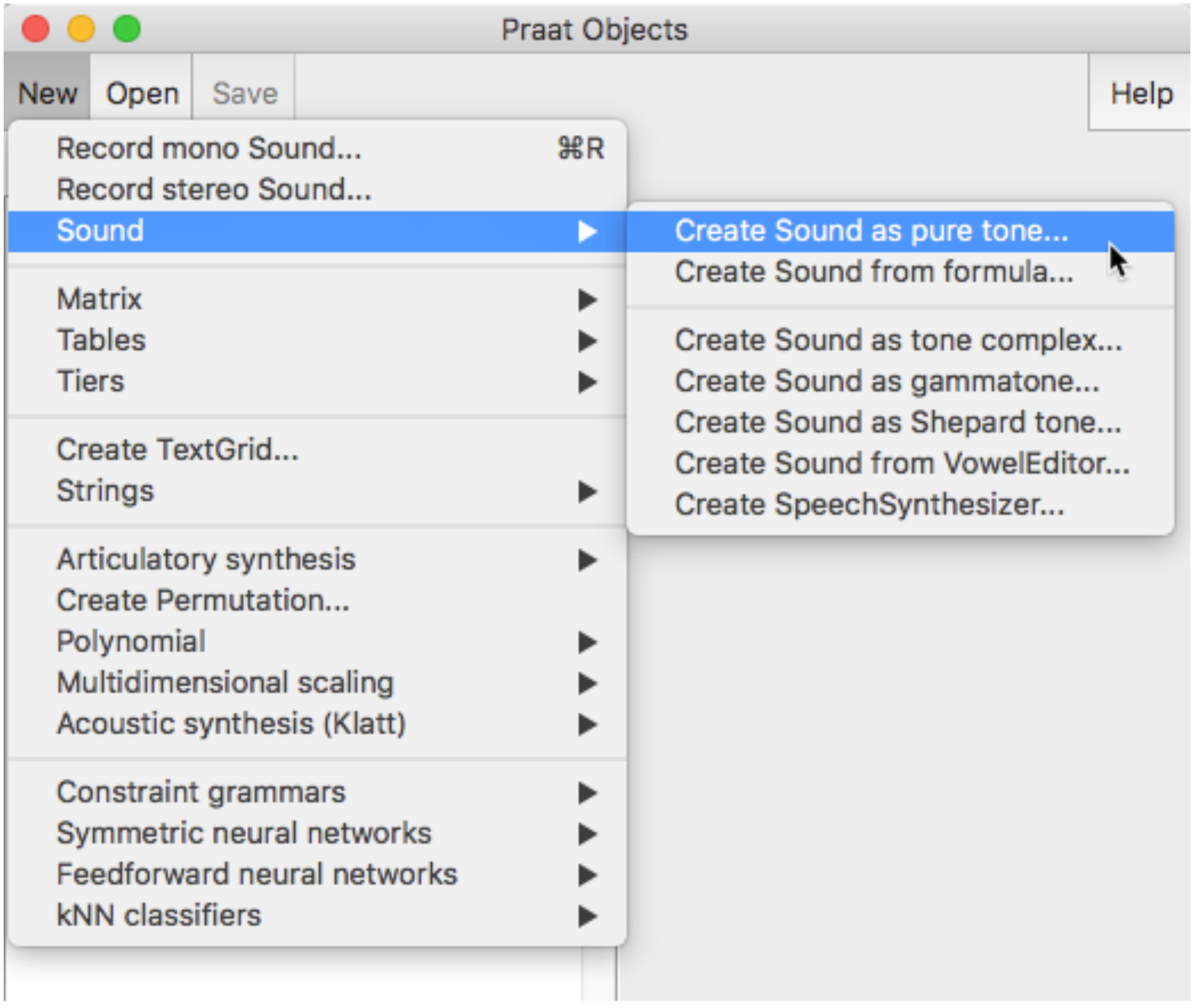
REMINDER: FREQUENCY OF SOUND WAVES

https://musiclab.chromeexperiments.com/Sound-Waves

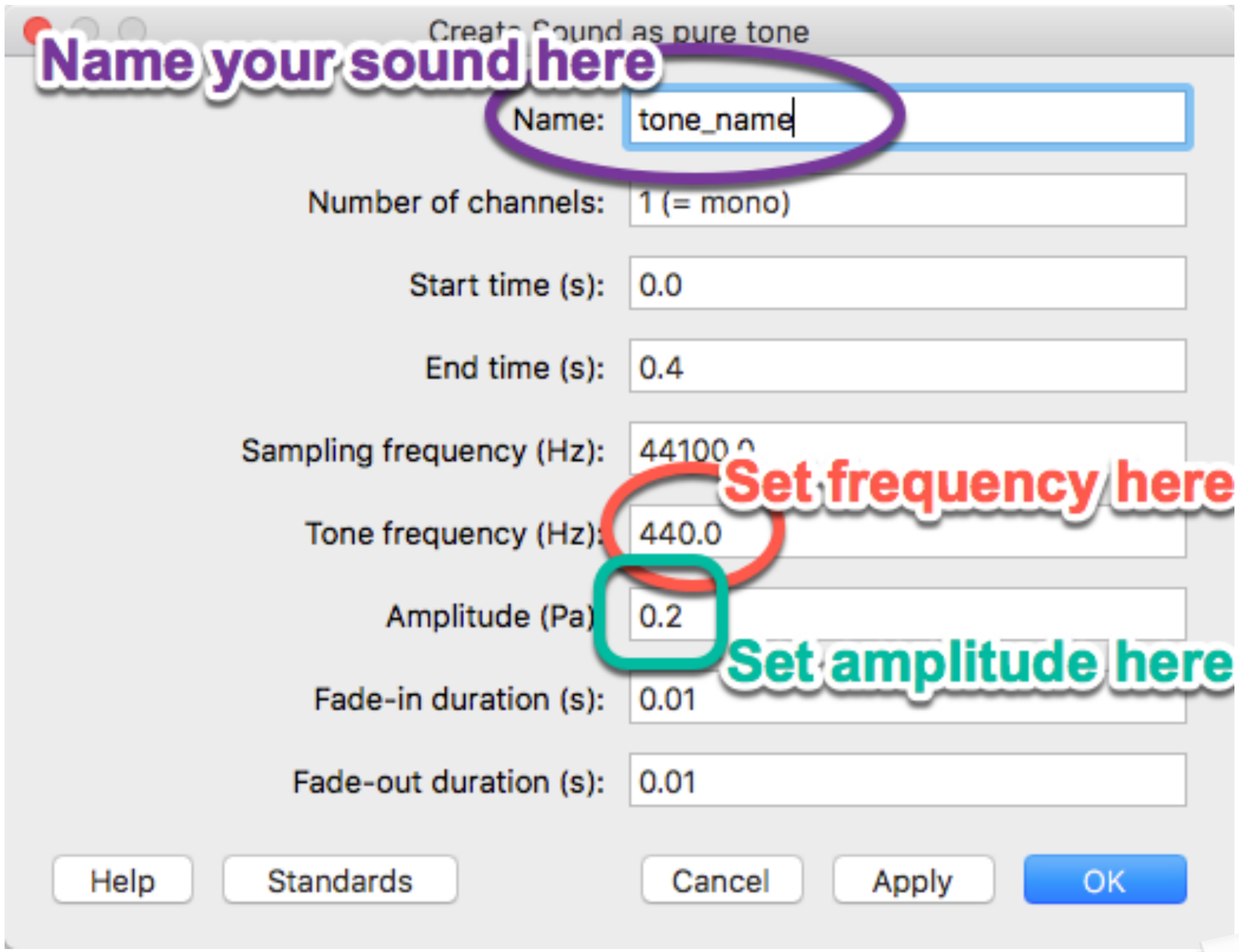


FUNDAMENTAL FREQUENCY IN PRAAT

DEMO: PURE TONES

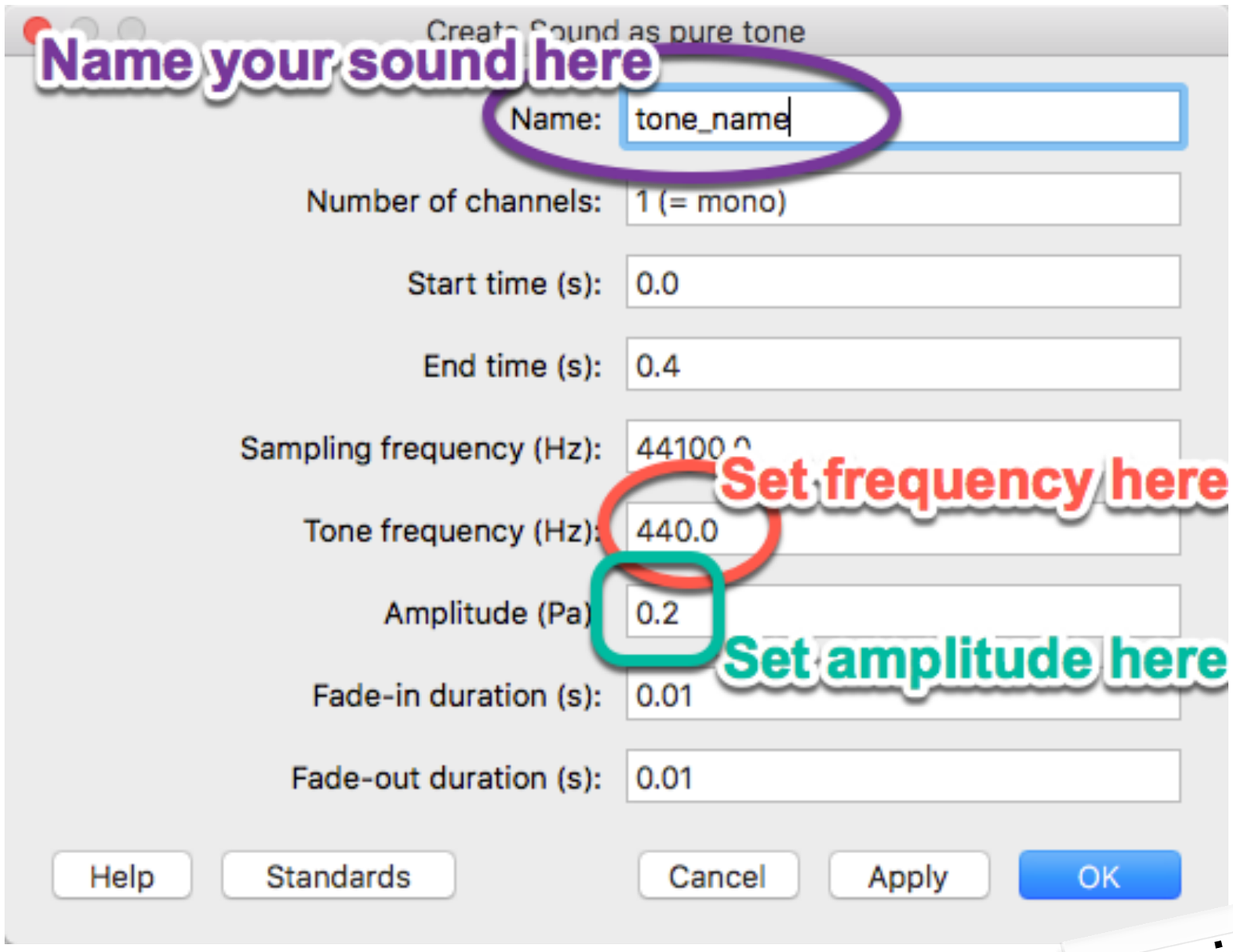


EXERCISE: PURE TONES, OCTAVE



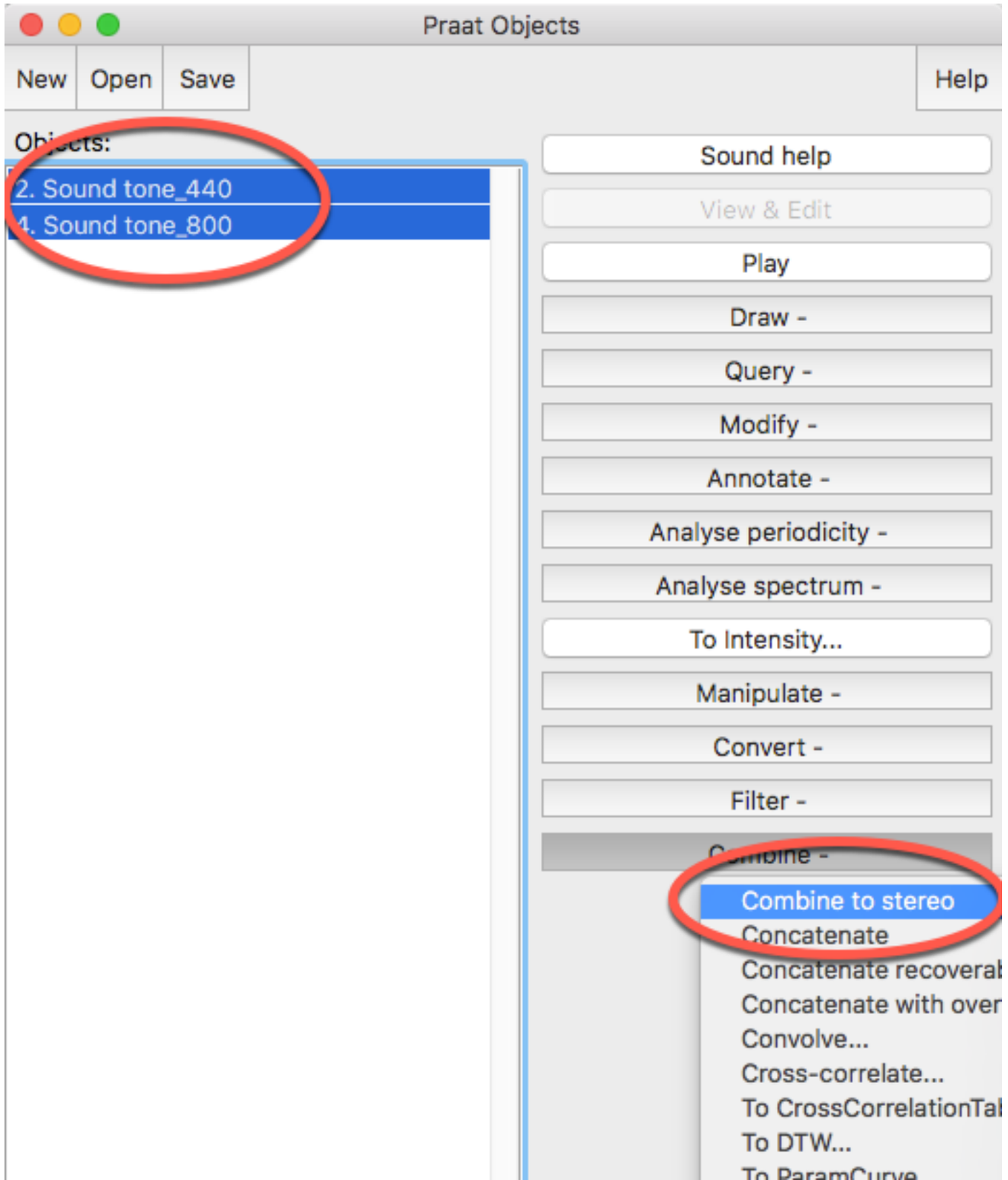
Exercise: Create an octave in Praat!

EXERCISE: PURE TONES, PERFECT FIFTH

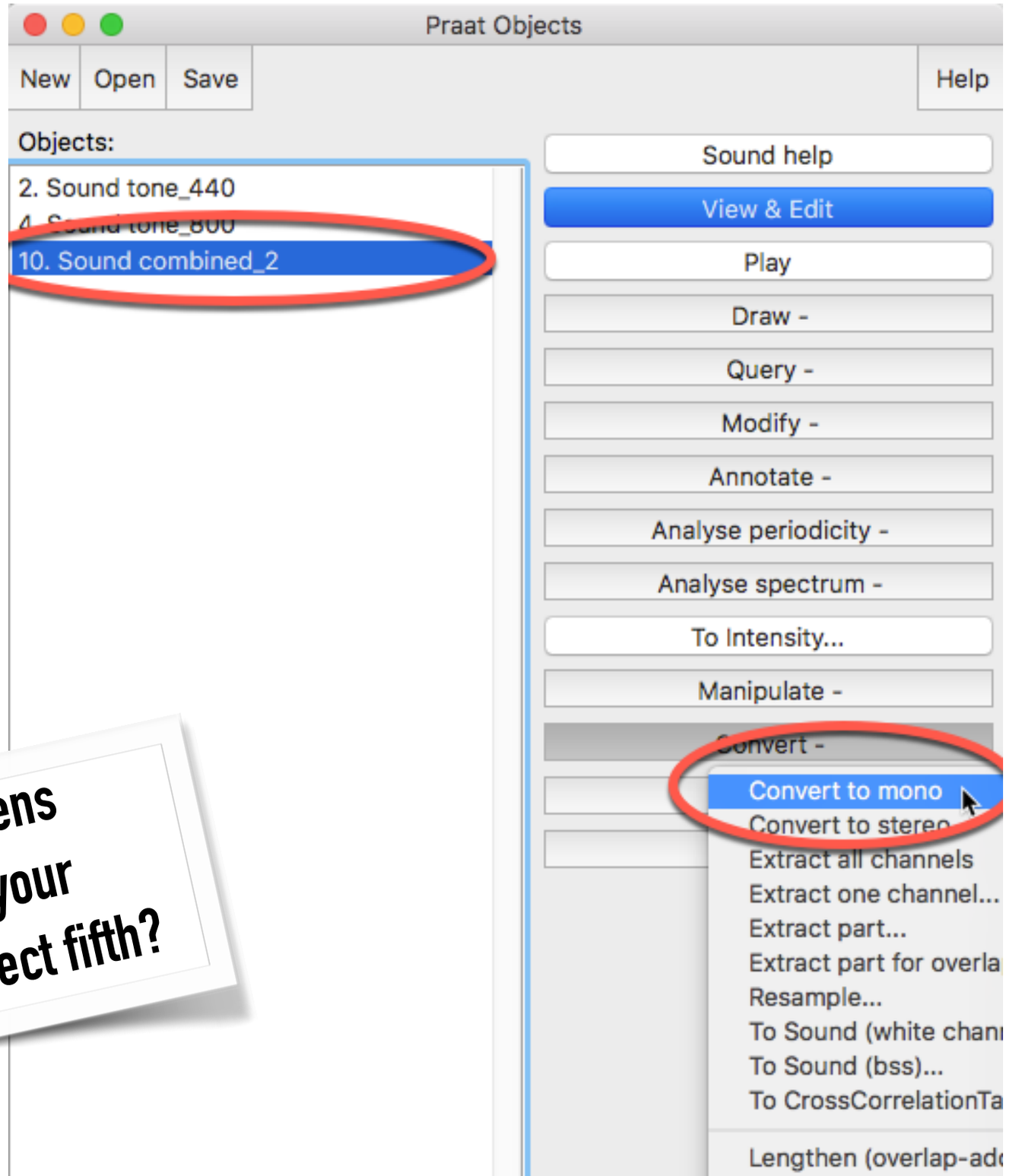


Exercise: Create a perfect fifth (3:2) in Praat!

EXERCISE: COMBINING PURE TONES, STEP 1



EXERCISE: COMBINING PURE TONES, STEP 2



Exercise: What happens when you combine your octave or your perfect fifth?