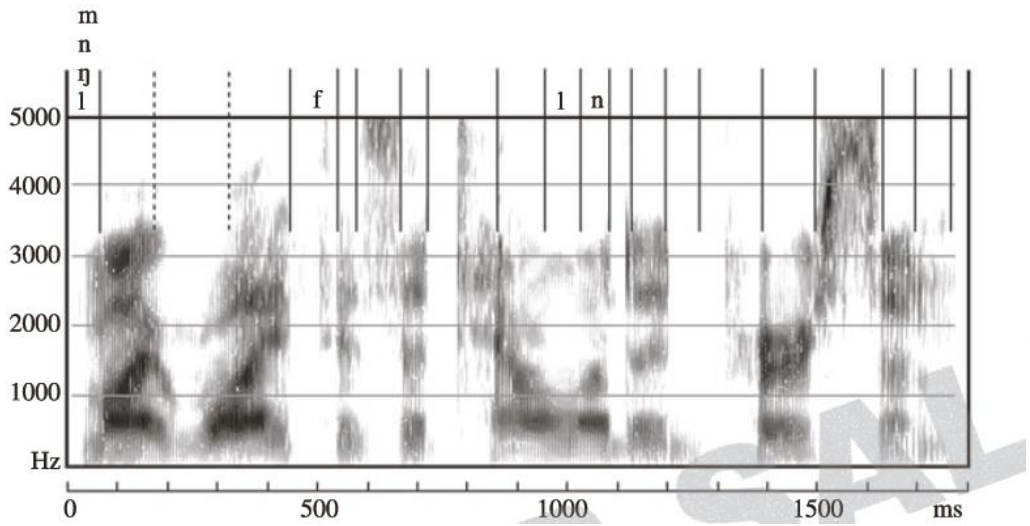
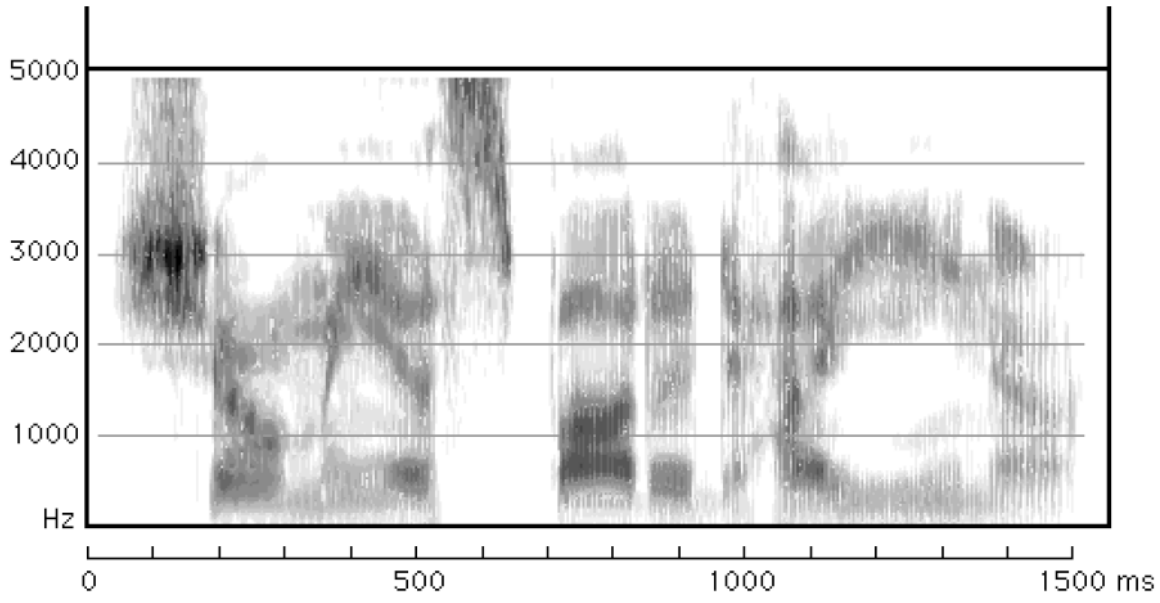
Name_____

Chapter 8 exercise

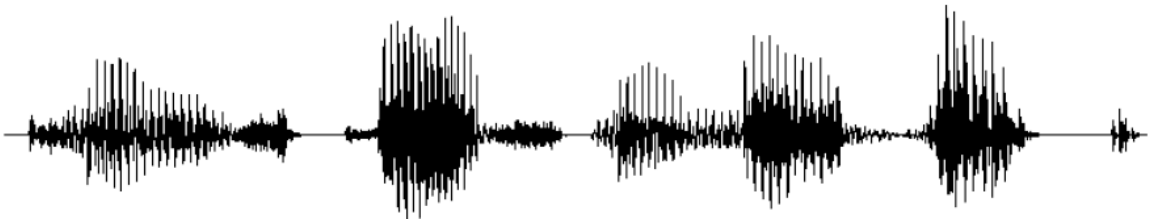
A. In the following spectrogram, the segments have been delimited, some with dashed lines as they do not have sharp boundaries. In each of the spaces above the spectrogram, write a symbol for a sound that has the same manner of articulation as that segment. Possible symbols for the first segment have been filled in as examples. A few other segments that are particularly difficult to determine have also been filled in.



B. The spectrogram below shows the phrase: *Show me a spotted hyena*. Put a transcription above it, and show the segment boundaries. In places where there are no clear boundaries (as in the first part of *hyena*) draw dashed lines.



C. Put a transcription of the segments in the phrase: *Please pass me my book.* above the waveform shown below. Draw lines showing the boundaries between the segments.



D. Using a speech analysis program like WaveSurfer, make spectrograms of the sound files in CD 8.2. Measure the F1, F2, and F3 in *bird*, *hand*, *two*, and *bush*. Given these measurements, which vowels are most similar to each other? Does this way of measuring vowel similarity correspond with your auditory judgment of their similarity?

E. Using the "4L" formula that relates vocal tract length and formant frequencies [$F_n = (2n - 1) \times c/4L$], what are the formant frequencies for [ə] of a child whose vocal tract is 9 cm long?

F. Again using the same formula, calculate the resonances of a vocal tract 16 cm long when the person is breathing air $c = 35{,}000\ cm/s$ versus helium $c = 92{,}700\ cm/s$.

G. The spectrogram is of an ordinary English sentence, containing no names, so obviously the third possibility shown for the first segment could not be correct, as no English sentence could begin with [ŋ]. Bearing in mind what sequences of sounds are possible in English, write as many words or syllables as you can. The sentence is a true statement.

H. Look at the sentence in Fig. 8.15, a spectrogram for which the text is not given. Say as much as you can about the different segments.

I. Looking at Figure 8.2, give the perturbation theory explanation for why F2 has a low frequency in the high back rounded vowel [u]. Californian English [u] has a somewhat higher F2 than is found in other varieties of English. Some people say that the Californian [u] is "fronted," while others think of it as "unrounded." Interestingly, perturbation theory doesn't help resolve this question—why not?