SHS homework 1: Introduction to speech with Praat

In this assignment we use the program Praat for analysis and manipulation of a speech sentence. Describe your experiences in a short report (at least answer the parts that are marked in green), and include the sound fragments that are marked in pink (all via **File upload** in Canvas).

1.1. Download and install **Praat** from praat.org. After you have opened Praat, two windows appear: an object window and a picture window. Both windows are empty.

1.2. Read the **Praat intro** that you find in the **Help** menu, as well as the first two chapters of the book *Speech Signal Processing with Praat* (and section 3.1 about recording).

1.3. Record the sentence "Er was eens een oud kasteel midden in een diep en donker bos" at a normal speaking rate (**New → Record mono Sound... → Record**, **Stop**, **Save to list and close**). After this, the *object window* contains a sound object, together with a whole list of new menu choices (the *dynamic menu*). Once your recording is good (use **Play** to check), save it to disk (via **Save as WAV file...**) for later reference and uploading.

1.4. Transcribe your sentence with IPA notation (think about a foreigner who knows IPA notation but does not know Dutch). For LaTeX users: to draw phonetic symbols, you can use the **tipa** package (\textipa{e:} peet; \textipa{o:} poot; \textopeno pot; \textscripta pat; \textipa{a:} paat; \textipa{E} pet; i p<u>ie</u>t; y p<u>uu</u>t; \textipa{\o:} peut; \textsci pit; \textscy put; \oe freule; \textschwa lop<u>e</u>n).

1.5. How many phonemes are there in the word "kasteel"? Describe the consonants in terms of the three features used in the IPA chart (example: /p/ is a voiceless bilabial plosive).

1.6. What are the articulation movements in the word "kasteel"? Describe the articulation movements in the word "kasteel" in terms of tongue movements and glottis opening and closing. Assume that we start with an open mouth, and the lungs are full of air and the glottis is closed.

1.7. Select your Sound object (it probably was already selected) and choose **View & Edit**. A Sound window opens, showing "Help" at its top right. Familiarize yourself with the interactions with this window:

• Zoom **In** (and perhaps **Out**) a couple of times to make sure that the visible part of the signal is smaller than the total signal.
• Click on the sound to make a cursor appear. Witness the grey rectangles change at the bottom, and find out what these rectangles do (click in them!).
• Drag the mouse across the sound to make a small selection (click in the rectangle above it). Scroll the selection in and out of view, watching how rectangles appear and disappear. Describe what the function of these rectangles is.

You can now select words and individual phonemes and listen to them.

1.8. Which plosive sounds occur in this sentence, and what are their closure durations and burst durations?

1.9. Draw a small *voiced* speech fragment from the sentence in the Picture window and include the picture in your report. Repeat for a short unvoiced speech segment. Before you can draw you have to select a large enough area in the picture window; otherwise your drawing will not be very successful.

1.10. Your first speech manipulation. Make a few new sentences by concatenating words taken out of the original sentence "Er was eens een oud kasteel midden in een diep en donker bos". Some possible sentences:

(a) In een diep en donker bos was eens een oud kasteel.
(b) In een diep bos was een kasteel.
(c) Er was eens een bos.
(d) Midden in een bos was een kasteel.

Hint: Make a copy of the original by using the **Copy...** command and zero its contents with the **Modify → Formula...** command, giving "0" for the formula (without the quotes). You can then paste the selections from the original sound into this copy.

What is correct about these new sentences, and what is incorrect? Upload at least one new sentence.

1.11. Your second speech manipulation. Try to make some new words by concatenating phonemes taken from the words (for example, try to make "last" and "stal" from "l", "a" and "st").

What is correct about these new words, and what is incorrect? Upload at least one new word.