Linguistics 384
Homework 1

Text and Speech Encoding

DUE: Wednesday, October 5, 2005

1. (20 pts) Consider the Cypriot syllabary mentioned in class (in the slides or at http://www.omniglot.com/writing/cypriot.htm). If Cypriot were written using a syllabic alphabet instead of with a syllabary:

   (a) How many letters would there be in the syllabic alphabet? (You can ignore the leftmost column of vowels.)

   (b) How could you modify the syllabary to create a syllabic alphabet? Give examples for syllables including all five vowels. (Hint: look at Redjang/Kaganga, `http://www.omniglot.com/writing/redjang.htm`)

2. (10 pts) Convert the decimal (a.k.a. base 10) number **235** into a binary (a.k.a. base 2) number.

3. (15 pts) Convert the following the binary numbers into decimal numbers. You may use any method discussed in class, but you must show the steps you followed to receive full credit.

   (a) 01101110

   (b) 10101011

   (c) 11011010

   (d) (extra credit - 5 pts) 0100110110011100

4. (30 pts) Write out the first **3** letters of the city you were born in (Romanized, if necessary) and give the corresponding ASCII codes for each of them in both decimal and **7-bit** binary notation. This is done below for my hometown "Asheville". Be sure that if you write a lowercase letter in your answer, I expect the number to match the lowercase ASCII code.

   Recall that we introduced two methods for converting decimal numbers to binary numbers. For the first letter, show how you derived the binary number using the "table" method. For the second letter, show how you derived the binary number using the "divide by 2" method. You do not need to show how you derived the binary number for the third letter.

letter	ASCII number	binary number
A	65	1000001
s	115	1110011
h	104	1101000

5. (10 pts) The stick your finger in your mouth exercise: In your own words, describe the differences between the following pairs of sounds. Consider: place of articulation (e.g., where your tongue is, which parts of the vocal tract are you using to produce the sound, etc.), voicing (i.e., if your vocal cords are vibrating), and manner of articulation (i.e., how the air is moving out of your mouth).

   (a) *t* (as in *top*) vs. *n* (as in *never*)

   (b) *p* (as in *pat*) vs. *g* (as in *gait*)

   (c) *th* (as in *thin*) vs. *th* (as in *this*)

6. (15 pts) Looking back at your notes for ASR and TTS systems—and, more importantly, THINKING about the issues involved—which do you see as a harder task: automatic speech recognition, or text-to-speech synthesis? Or are they equally hard? I'm not looking for one correct answer, just solid reasoning.