

# Homework 1: Text and Speech encoding

## Linguistics 384

(Submit homeworks as pdf, html, or plain text to dropbox in Carmen.)

1. (30 points) Go to [www.omniglot.com](http://www.omniglot.com). Find one example of an abjad, an alphabet (NOT Latin/Roman), a syllabary, a syllabic alphabet, and a logography. For each example, write down the name of the writing system and two facts about it.
2. In class we mentioned how many characters can be stored with a certain number of bits. Here's a recap:

Number of bits	Number of characters
1	2
2	4
3	8
4	16
5	32
6	64
7	128
8	256

- (a) (10 points) Based on this, how many characters would you be able to store using 9 bits?
  - (b) (10 points extra) What is the general formula – i.e. for  $n$  number of bits, how many characters can you store?
3. (20 points) Give me the base ten numbers for the following binary numbers (written in standard order, i.e., Big Endian):
  - (a) 1011 0111
  - (b) 0101 1101
  - (c) 1010 1010
  - (d) 1010 0110

4. (20 points) Write out *Ohio State University* using ASCII code, in both ordinary numbers (base 10) and binary (base 2, in standard order).

Keep in mind that lowercase and uppercase letters have different ASCII codes!

As an example, here is what this looks like for my family name.

letter	ASCII number	bit notation
M	77	100 1101
e	101	110 0101
u	117	111 0101
r	114	111 0010
e	101	110 0101
r	114	111 0010
s	115	111 0011

5. The “stick your fingers in your mouth” exercise ;-)) In your own words, describe the differences between the following pairs of sounds. Mention at least the following: where your tongue is, if your tongue is making contact with any part of your mouth, if your vocal cords are vibrating, where/how the air is moving out of your mouth, etc. There may be more than one difference. (When in doubt, simply describe what’s happening.)

- (a) (10 points) *p* vs. *v* (as in *pet* vs. *vet*)
- (b) (10 points) *n* vs. *ng* (as in *pen* vs. *ring*)
- (c) (10 points extra) *r* vs. *l* (as in *bar* vs. *ball*)

6. (20 points extra) 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 sensible reasoning based on the facts we discussed – write down a couple of short paragraphs.