

Linguistics for Computer Scientists

Session 3: Phonology

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1. Make a list of English one-syllable words of CVC structure. Use minimal pairs to “bootstrap” an inventory of English phonemes from this list.
 - (a) Is your inventory complete?
 - (b) How many CVC words could you theoretically generate with this inventory?
 - (c) How many of those are actual English words?
 - (d) How many words could you generate if syllable structures of $(C_2)V(C_3)$ were allowed? Compare this to an estimate of how many words the English language actually has.
 - (e) Why are only a small fraction of the words you could generate actual English words?
2. Take a look at the IPA chart of vowels. If you were asked to develop a system of distinctive features to describe all of the vowels shown, how would you proceed, given the condition that
 - (a) only binary features were to be used, or
 - (b) only two features were to be used, or
 - (c) the distance from the central vowel schwa (ə) was to be used as one of the features?
3. Here is a list of a few German words:

• echt	• Buche
• Docht	• weicher
• mich	• Habicht
• auch	• Wächter
• Bach	• Tochter
• nach	• Töchter

 - (a) Look up their (phonetic) pronunciations.
 - (b) The underlying phoneme $/x/$ (written as $\langle ch \rangle$) is realized either as $[x]$ or $[\text{ç}]$. Write a phonological rule which explains this allophonic variation.