

# LING 20 Homework 3

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## Problem 1

**State a single phonotactic constraint on English onsets that prohibits all of the impossible onsets but still allows the possible ones. This constraint should not involve disjunction (“X or Y”). You will need to use articulatory features to write the constraint.**

[+stop] cannot occur after [+stop] in an English onset.

## Problem 2

For each of the following pairs of sounds, please provide a minimal pair showing that they are allophones of different phonemes in English. Write this minimal pair both in English orthography and in the IPA.

a) [p] and [k]

pot ([pɑt]) vs. cot ([kɑt])

b) [l] and [s]

lip ([lɪp]) vs. sip ([sɪp])

c) [æ] and [ɛ]

rad ([ɪæd]) vs. red ([ɪɛd])

d) [ej] and [ɛ]

bait ([beɪt]) vs. bet ([bɛt])

e) [ɪ] and [t]

rap ([ɪɹɒp]) vs. tap ([tɹɒp])

## Problem 3

**In Cochabamba Quechua, the sounds [i, u] and [e, o] are in complementary distribution. What are the phonemes and allophones? State a phonotactic constraint that restricts the vowels' distribution and a rule that turns one set into the other.**

**a) State a generalization about when [i, u] and [e, o] appear, respectively.**

[e, o] appear following [q], while [i, u] appears otherwise.

**b) What phonemes are [i, u] and [e, o] allophones of?**

[u] and [o] are allophones of the phoneme /u/, while [i] and [e] are allophones of the phoneme /i/.

**c) State a phonotactic constraint that prohibits the underlying form in the right environments. Write this constraint using IPA symbols.**

[u] and [i] cannot occur after [q].

**d) Now state this constraint using articulatory features instead of IPA symbols. The constraint must be a single statement ("It is not possible to have ...") and must not involve disjunction ("X or Y").**

[+high +tense] cannot occur after [+uvular +stop +oral -voice].

**e) Based on this constraint, provide two rules that change the underlying form in the right environments. Use IPA symbols in these rules.**

Change /i/ to [e] when it follows [q].

Change /u/ to [o] when it follows [q].

**f) Now formulate one single rule using features instead of IPA symbols.**

Change [+high +tense] to [+mid] when it follows [+uvular +stop +oral -voice].

## Problem 4

Compare the alveolar fricatives and the postalveolar fricatives in the following data from Southern Congo. The voiced fricatives are in complementary distribution with each other, and so are the voiceless fricatives.

a) State a generalization about when the alveolar fricatives and the postalveolar fricatives appear, respectively.

The postalveolar fricatives appear preceding [i], while the alveolar fricatives appear otherwise.

b) What phonemes are the alveolar and postalveolar fricatives allophones of, respectively?

[s] and [ʃ] are allophones of the phoneme /s/, while [z] and [ʒ] are allophones of the phoneme /z/.

c) State a phonotactic constraint that prohibits the underlying forms in the right environments. Write this constraint using IPA symbols.

[s] and [z] cannot appear preceding [i].

d) Now state this constraint using articulatory features instead of IPA symbols. The constraint must be a single statement (“It is not possible to have ...”) and must not involve disjunction (“X or Y”).

[+alveolar +fricative] cannot occur preceding [+front +high -rounding +tense].

e) Based on this constraint, provide a rule that changes the underlying forms in the right environments. Use IPA symbols in this rule.

Change /s/ to [ʃ] when it precedes [i].

Change /z/ to [ʒ] when it precedes [i].

f) Now formulate this rule using features instead of IPA symbols.

Change [+alveolar +fricative] to [+postalveolar] when it precedes [+front +high -rounding +tense].