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Acknowledgments

This is an unfinished major revision of the Asian Linguistics Workbook originally compiled by Professor Hal Schiffman with the assistance of various members of the faculty and staff of the University of Washington’s Asian Languages & Literature department.

Prof. Schiffman devoted an enormous amount of time and effort to collecting data and problem sets to explicate the basic concepts of the field of linguistics through Asian language examples. Although the workbook that he compiled was a gold mine of valuable data, the passage of time had, by the 2000s, rendered it impractical for a number of reasons.

The aims of the current revisions are:

1) To replace the Americanist and other phonetic notations with International Phonetic Alphabet where appropriate;

2) To re-order the problem sets so that they progress more deliberately from simple to complex;

3) To eliminate some problem sets and introduce others in order to improve the overall efficacy of the workbook;

4) To correct errors.

The revision is still very much a work in progress. Students and instructors will note gaps, inconsistencies, and errors. One major gap is in these acknowledgments, which do not yet adequately credit the sources of many of the problem sets.

I would be grateful to students and faculty if they would point out errors and make suggestions for improvements.

Zev Handel, Seattle, March 2009
Chapter 1: Phonetics and Phonology

1.1 Phonetics

1.1.1 Phonetics Exercises

1. Transcription (International Phonetic Alphabet)

Transcribe the sounds as you would pronounce them when speaking slowly and clearly. Consider [w j l ɹ] to be consonant sounds. Don’t forget to transcribe aspiration!

   a. Write appropriate phonetic symbols within the brackets provided to represent the initial consonant or consonant cluster sounds of each of the following English words:

      phrase [_____]  whine [_____]  quite [_____]  
      cure [_____]  then [_____]  shoot [_____]  
      jump [_____]  chart [_____]  psychology [_____]  
      chronic [_____]  think [_____]  thrill [_____]  

   b. Write appropriate phonetic symbols within the brackets provided to represent the final consonant or consonant cluster sounds of each of the following English words:

      dozed [_____]  fifth [_____]  forced [_____]  
      garage [_____]  strength [_____]  myths [_____]  
      innings [_____]  coughed [_____]  days [_____]  
      sixth [_____]  booths [_____]  flinched [_____]  
      thanked [_____]  couldn’t [_____]  clothes [_____]  

   c. Write appropriate phonetic symbols within the brackets provided to represent the vowel sounds of each of the following English words:

      his [_____]  love [_____]  nod [_____]  
      beg [_____]  latch [_____]  trees [_____]  
      blaze [_____]  died [_____]  rude [_____]  
      node [_____]  coin [_____]  should [_____]  
      put [_____]  caught [_____]  mouse [_____]  

   d. Transcribe the following words phonetically:

      shrink [_____]  then [_____]  three [_____]  
      phrased [_____]  chrome [_____]  cuter [_____]  
      flunked [_____]  judges [_____]  once [_____]  
      whiled [_____]  seizure [_____]  pressure [_____]  

2. Symbolization

Supply IPA symbols to represent each of the following phonetic descriptions:

a. voiced alveolar stop [ ]
b. voiceless aspirated bilabial stop [ ]
c. voiceless alveopalatal fricative [ ]
d. high front unrounded vowel [ ]
e. mid-low back rounded vowel [ ]
f. velar nasal [ ]

3. Phonetic Descriptions

Describe in articulatory phonetics terminology the sounds represented by each of the following IPA symbols (e.g. “[t] is a voiceless unaspirated alveolar stop”; “[u] is a high back unrounded vowel”):

a. [p] __________________________________________
b. [ʃ] __________________________________________
c. [õ] __________________________________________
d. [æ] __________________________________________
e. [kʰ] __________________________________________
f. [ɛ] __________________________________________
g. [t] __________________________________________
h. [y] __________________________________________
i. [ŋ] __________________________________________

4. Natural Classes

In each group, circle the symbol that represents a sound that lacks a feature (e.g. a place of articulation, a manner of articulation, roundedness) shared by the others, then name the feature that it lacks:

a. pʰ m b n p is not________________________
b. i e u ε æ is not________________________
c. s z ʃ dʒ ʒ is not________________________
d. l m n ŋ ŋ is not________________________
e. y u e o ɔ is not________________________
1.2 Phonemics and Phonology

1.2.1 Example: Japanese Fricatives

Consider the phonemic status of [h] and [f] in Japanese based on the following data. (Note that here the symbol [f] actually represents a voiceless bilabial fricative, IPA [ɸ].)

1. [haha] ‘mother’ /___________/
2. [hoho] ‘cheek’ /___________/
3. [he] ‘fart’ /___________/
4. [heso] ‘navel’ /___________/
5. [fuɡɯ] ‘poisonous blowfish’ /___________/
6. [fuɗʃi] ‘Mt. Fuji’ /___________/
7. [hi] ‘day’ /___________/
8. [haku] ‘spit out’ /___________/
9. [hikɯ] ‘draw out’ /___________/
10. [fuku] ‘blow’ /___________/

Do [f] and [h] belong to separate phonemes or allophones of a single phoneme? Explain your conclusion, and write appropriate phonological rules. Then rewrite the words above in a phonemic notation.

Solution: We find no minimal pairs contrasting [f] and [h]. Furthermore, these sounds are in complementary distribution, i.e. they occur in different non-overlapping environments and never contrast. [f] occurs only before the vowel [ɯ], and [h] occurs before all other vowels. As voiceless fricatives, the two sounds are similar. Therefore, we conclude that these two sounds are allophones of a single phoneme. Since [h] occurs in more environments, we will name the phoneme /h/.

/h/ → [f] before [ɯ] or /h/ → [f] / _u
→ [h] elsewhere

The phonemic forms of the words are in notation identical to the phonetic forms, with the exception of #5 /huɡɯ/, #6 /huɗʃi/, and #10 /huku/.

Note: In all of the problems in this section, you may assume that phonetic and phonemic notation will be identical aside from those phones on which you are asked to carry out analysis. In other words, when asked to rewrite the words above in phonemic notation, you need only be concerned about whether the phonemic notation for [h] and [f] will differ from the phonetic notation, and may copy out the other phonetic symbols unchanged.

1.2.2 Hypothetical Language A

Consider the status of [a] and [ə] based on the following data:
1. [famu] ‘rowboat’  
2. [latuki] ‘thighbone’  
3. [pugan] ‘lollipop’  
4. [dam] ‘down’  
5. [gay] ‘bog’  
6. [unjaf] ‘door’  
7. [wifæg] ‘window’  
8. [ma yan] ‘dictionary’  
9. [manfæ] ‘no’

10. [ʔigæ] ‘timely’  
11. [ʔeʔa] ‘yesterday’  
12. [ʔitimæ] ‘early’  
13. [ʔipola] ‘quiz’  
14. [ʔinmæ] ‘grief’  
15. [ʔiʃa] ‘to misinform’  
16. [ʔiʃaiʃa] ‘birth-bath’

1. Do [a] and [ə] belong to separate phonemes, or are they allophones of the same phoneme? State their distribution.

2. Based on your answer, rewrite the following words phonemically:
   a. [famu] ‘rowboat’ /__________/
   b. [ʔigæ] ‘timely’ /__________/
   c. [ʔipola] ‘quiz’ /__________/
   d. [ʔomsæ] ‘goose’ /__________/
   e. [ma yan] ‘dictionary’ /__________/
   f. [fanræ] ‘birth-bath’ /__________/

1.2.3 Korean Sibilants (and ‘Shibilants’)

Consider the status of [s] and [ʃ] based on the following Korean data:

1. [saram] ‘person’
2. [set] ‘three’
3. [sugan] ‘towel’
4. [sam] ‘island’
5. [sc] ‘bird’
6. [undʒansu] ‘driver’
7. [wisæŋ] ‘satellite’
8. [mosun] ‘contradiction’
9. [mansɛ] ‘long live …!’

10. [ʃigan] ‘time, hour’
11. [ʃefs] ‘three o’clock’
12. [ʃiʃhada] ‘be dull, insipid’
13. [ʃhæm] ‘examination’
14. [ʃinmun] ‘newspaper’
15. [ʃiʃi] ‘instructions’
16. [ʃamʃim] ‘lunch’
17. [ʃænʃin] ‘mountain spirit’
18. [ʃæʃim] ‘absent-mindedness’
1. Do [s] and [ʃ] belong to separate phonemes, or are they allophones of the same phoneme? State their distribution.

2. Based on your answer, rewrite the following words phonemically:
   a. [sɛ] ‘bird’ / __________ /
   b. [mansɛ] ‘long live ...!’ / __________ /
   c. [tʃʌmʃim] ‘lunch’ / __________ /
   d. [ʃinmʊn] ‘newspaper’ / __________ /
   e. [set] ‘three’ / __________ /

1.2.4 Kannada Retroflex Liquids

1. Where is Kannada spoken, and to what language family does it belong?

________________________________
________________________________
________________________________

Consider the status of [l] and [ɭ] (a retroflex lateral, IPA [ɭ]) in Kannada based on the following data. [:] indicates that the preceding vowel is long.

1. [kɔllu] ‘kill’
2. [huɭi] ‘sour tamarind’
3. [heːlu] ‘say’
4. [keːlu] ‘ask, hear’
5. [ɪlɪ] ‘here’
6. [hulɪ] ‘tiger’
7. [heːlu] ‘defecate’
8. [yoːlu] ‘seven’
9. [kiːlu] ‘uproot’
10. [elɪ] ‘rat’
11. [haːlu] ‘milk’
12. [koɭlu] ‘buy’

2. Do [l] and [ɭ] belong to separate phonemes, or are they allophones of one phoneme?
   a. If your conclusion is that they belong to distinct phonemes, describe the environments in which they contrast, and if possible, provide minimal pairs.
   
   b. If your conclusion is that they are allophones, describe the distinct environments in which they occur in complementary distribution.
1.2.5 Punjabi Tone

1. Where is Punjabi (also written Panjabi) spoken, and to what language family does it belong?

In the Punjabi data below, the symbols ̀, ̄, ́ (where  is any vowel) represent three different tones. ̀ indicates a low tone, ̄ indicates a mid tone, and ́ indicates a high tone. Phonetically, Punjabi has three different tones. Your task is to determine how many phonemic tones Punjabi has. Does Punjabi have one phonemic tone with three allophonic tones, two phonemic tones (one of which has two allophonic tones), or three phonemic tones?

1. [kòra:] ‘horse’ / _________ /
2. [làːi] ‘disgrace’ / _________ /
3. [càː] ‘peep’ / _________ /
4. [kòra:] ‘unused’ / _________ /
5. [càː] ‘tea’ / _________ /
6. [kàɾ] ‘chisel’ / _________ /
7. [kòra:] ‘leper’ / _________ /
8. [kàɾ] ‘bottom’ / _________ /
9. [kàɾ] ‘boil’ / _________ /
10. [làːi] ‘stuck’ / _________ /
11. [càː] ‘enthusiasm’ / _________ /
12. [làːi] ‘detached’ / _________ /

2. How many phonemic tones does Punjabi have? Justify your answer by identifying contrasting environments or complementary distribution.

a. If your conclusion is that they belong to distinct phonemes, indicate the environments in which they contrast, and if possible, provide minimal pairs.
b. If your conclusion is that there are fewer than three phonemic tones, rewrite the words above in a phonemic transcription.

1.2.6 Korean Liquids

Korean [l] is a dental lateral, with the tongue positioned at the back of the upper front teeth. Korean [ɾ] is pronounced with a flap of the tip of the tongue at this same position. Consider the following Korean data containing these two sounds.

1. [nal] ‘day’          10. [nari] ‘day (subject form)’
2. [ppalgan] ‘red’     11. [saram] ‘person’
6. [tʃalban] ‘half’     15. [uri] ‘we’
7. [aldaʃipi] ‘as you know’ 16. [irwʌ] ‘January’
8. [jal] ‘ten’         17. [kwrjʌjo] ‘draw (a picture)’

1. What is the phonemic status of [l] and [ɾ] in Korean? Justify your answer and describe the distribution of the two sounds.

2. Rewrite the following words in phonemic notation.

a. [nal] ‘day’          / _________ /

b. [nari] ‘day (subject form)’ / _________ /

c. [kil] ‘road’          / _________ /

d. [kiri] ‘road (subject form)’ / _________ /

e. [halmʌni] ‘grandmother’ / _________ /

f. [harabʌdʒi] ‘grandfather’ / _________ /
1.2.7 Sinhala Apical Stops

1. Where is Sinhala (also called Sinhalese) spoken, and to what language family does it belong?

In the following data, [ṭ] and [ḍ] represent retroflex stops (IPA [ʈ] and [ɖ]). Doubled vowel symbols (e.g. [aa]) represent long vowels.

1. [daa] ‘day’
2. [dihaawa] ‘direction’
3. [niwaadu] ‘vacation’
4. [palaata] ‘province’
5. [dakunu] ‘southern’
6. [ḍrajwəɾ] ‘driver’
7. [tihə] ‘thirty’
8. [təwə] ‘still’
9. [nidahas] ‘independence’
10. [badu] ‘taxes’
11. [tænə] ‘place’
12. [atə] ‘hand’
13. [ḍaanu] ‘to bite’
14. [mædə] ‘middle’
15. [baḍu] ‘goods’
16. [ḍaadija] ‘sweat’
17. [ada] ‘today’
18. [madi] ‘not enough’
19. [daruwo] ‘children’
20. [padintʃiʃe] ‘residence’
21. [iità] ‘to that’
22. [deewi] ‘might give’
23. [ḍoktə] ‘doctor’
24. [aḍə] ‘half’
25. [wæḍə] ‘work’
26. [poḍi] ‘little’
27. [aṭə] ‘eight’
28. [tika] ‘a few’

2. Are retroflex stops [ṭ] and [ḍ] phonemically distinct from alveolar stops [t] and [d]? Justify your answer.

3. If you have determined that [ṭ] and [ḍ] are not phonemically distinct from [t] and [d], then rewrite the following words in a phonemic transcription of your choice.

a. [ḍrajwəɾ] ‘driver’
   / __________ /

b. [ḍaanu] ‘to bite’
   / __________ /

c. [baḍu] ‘goods’
   / __________ /

d. [ada] ‘today’
   / __________ /

e. [madi] ‘not enough’
   / __________ /
1. Are the aspirated consonants allophones of other phonemes, or are they phonemically distinct?

1.2.9 Gujarati Retroflexes and Sibilants

1. Where is Gujarati spoken, and to what language family does it belong?
In the following Gujarati data, [ṭ], [ḍ], [ṇ] and [ṣ] represent retroflexes (IPA [ʈ], [ɖ], [ɳ], [ʂ]). [ś] is a pre-palatal fricative (IPA [ʃ]). Long vowels are indicated by a macron.

1. [kār] ‘car’
2. [tār] ‘telegram’
3. [ṭār] ‘tar’
4. [mān] ‘respect’
5. [māṇ] ‘type of pot’
6. [nād] ‘artery, pulse’
7. [nād] ‘loud noise’
8. [spāṣṭ] ‘clear’
9. [ṣṭēsan] ‘railroad station’
10. [śū] ‘you saw’
11. [śi] ‘mistake’
12. [śāp] ‘ear’
13. [sāp] ‘save’
14. [pāse] ‘she saw’
15. [rūṣi] ‘enough’
16. [rūṣi] ‘put’
17. [kāṣṭ] ‘jump’

2. Are the retroflex consonants phonemically distinct from their corresponding dental consonants? Justify your answer, making reference to their distribution.

3. What is the phonemic status of the three fricatives [s], [ś], [ʂ]? Is it possible to group two or more of these sounds into a single phoneme? If so, state the allophones of the phoneme and the environment in which they appear. If not, state the contrasting distribution that confirms their phonemic status.

1.2.10 Korean Stop Consonants

Analyze the distribution of the voiceless/voiced pairs [p] [b], [t] [d], [k] [g], and [tʃ] [dʒ]. (The sounds written with doubled letters [pp], [tt], [ttʃ] etc. are tense consonants, and are not relevant to this problem. In IPA they could be written with the diacritic for ‘strong articulation’ , e.g. [t]. You should ignore them when carrying out your analysis.)

1. [kaǔl] ‘autumn’
15. [kaǔri] ‘autumn (subject)’
1. Are there any minimal pairs in this data which demonstrate a phonemic contrast between the members of a voiced/voiceless pair? If so, list them.

2. Which of the eight sounds in the four voiced/voiceless pairs
   a. occur in word-initial position? 
   b. occur in word-final position? 
   c. occur in word-medial position? 

3. Are the voiced and voiceless sounds phonemically distinct, or does each pair consist of allophones of a single phoneme? Justify your answer with reference to the distribution of the sounds, and if you establish new phonemes, describe the environments in which the allophones occur. **Hint**: Make sure that your phonological rules adequately explain the pronunciation of [paŋapta] ‘glad (to see s.o.)’!

4. Rewrite the following words in phonemic notation.
   a. [paŋapta] ‘glad (to see s.o.)’ / __________ /
1.2.11 Chinese Low Vowels

These words of Standard Mandarin Chinese contain three different low vowels: [a], [A], and [ạ]. The symbol [A] represents a low central vowel halfway between [a] and [ạ]; in IPA it could be symbolized [a]. [tɕ tɕʰ ē] are palatals that are pronounced slightly farther back and with a higher, flatter tongue than are [tʃ tʃʰ ʃ]. Tone classes are indicated by superscript numbers 1 through 4; they are not relevant to this problem.

1. [tʰan²] ‘chat’
2. [xaw³] ‘good’
3. [saj³] ‘shine’
4. [maj³] ‘buy’
5. [tɕʰjaw²] ‘bridge’
6. [maw¹] ‘cat’
7. [swaŋ¹] ‘pair’
8. [kʰan⁴] ‘look’
9. [tʰA¹] ‘he/she’
10. [maŋ²] ‘busy’
11. [kwaj⁴] ‘strange’
12. [tɕJA¹] ‘home’
13. [laj²] ‘come’
14. [tɕʰaŋ²] ‘long’
15. [maj⁴] ‘sell’

1. How many low vowel phonemes are there: one, two, or three?

2. If any of these low vowels is in complementary distribution and can be collapsed into a single phoneme, choose a symbol for the phoneme(s) and indicate in which environment the allophones appear.

1.2.12 Tamil Apical Stops

1. Where is Tamil spoken, and to what language family does it belong?
In the following data, [ṭ] and [ḍ] represent retroflex stops (IPA [ʈ] and [ɖ]), and [t] and [d] represent dental stops. Long vowels are indicated by [:]. Doubled consonant letters (like [tt]) can be interpreted either as long consonants or as a cluster of two identical consonants.

1. [taːtaː] ‘grandfather’
2. [paːttʰi] ‘grandmother’
3. [pattu] ‘ten’
4. [paːttu] ‘song’
5. [tandi] ‘wire’
6. [reːndũː] ‘two’
7. [anda] ‘that’
8. [veːndːː] ‘don’t want’
9. [uŋ̟dũ] ‘there is’
10. [vandeː] ‘you came’
11. [kaːndː] ‘you saw’
12. [tapu] ‘mistake’
13. [kaːdu] ‘ear’
14. [kaːppattu] ‘save’
15. [paːttː] ‘she saw’
16. [poːdu] ‘enough’
17. [poːdũ] ‘put’
18. [kudi] ‘jump’
19. [kuḍi] ‘drink’
20. [paːtũ] ‘silk’

2. List all minimal pairs you can find in which any two of [ṭ], [ḍ], [t], [d] contrast, and state your conclusion about which pairs of sounds must belong to different phonemes.

3. For the pairs of sounds which do not appear to contrast, can you state distributional environments that are complementary? Bear in mind that suprasegmental features like consonant length are part of the environment in which segments occur.

4. Based on your answers to the previous questions, state whether the four sounds belong to distinct phonemes, or if they can be collapsed into a smaller number of phonemes.
5. Identify each phoneme, give it a symbol, and write phonological rules to indicate the conditions under which each allophone appears.

1.2.13 Tamil Rounded and Unrounded Vowels

1.2.14 Hindi Phonemics

1.2.15 Japanese Sibilants

1.2.16 Tamil Vowel Length

The following data contain examples of phonetically short and phonetically long vowels.

2. [taːndi] ‘having jumped’    10. [indaː] ‘here (is)’
3. [uːrũ] ‘town’    11. [inda] ‘this’
5. [soːru] ‘cooked rice’    13. [kuːdu] ‘give’
7. [pesakuv] ‘error’    15. [poj] ‘(a) lie’

1. Is vowel length phonemically distinctive in Tamil? State the reasons for your answer.

1.2.17 Japanese Stops and Affricates

Consider the following Japanese data:
1. Based on this data, analyze the phonemic status of [t], [ts], [tʃ]. State the distribution of each sound.

2. Rewrite the words above in phonemic transcription.

1.2.18 Vietnamese Doubly-Articulated Stops

The following set of Vietnamese words contains instances of a single segment called a labiovelar stop, notated [kʰ]. These stops are articulated with a simultaneous labial and velar closure. The symbol [ɓ] represents an implosive voiced bilabial stop. Vietnamese is a tonal language, but the representation of tone has been omitted here for simplicity.
15. [mɛp] ‘lid, edge’ 34. [ket] ‘braid, weave’
16. [ku̯k̚p] ‘daisy’ 35. [kiə] ‘(over) there’
17. [ɓuaə] ‘to step’ 36. [ɓap] ‘slap, smack’
18. [ŋik] ‘to shift’ 37. [zap] ‘armor, martial’
19. [viək] ‘work, task’ 38. [zak] ‘threadbare’

1. What is the distribution of the labiovelar stop [k̚p]?

________________________________________________________________________
________________________________________________________________________

2. Is [k̚p] a distinct phoneme, or is it an allophone of another phoneme? If it is an allophone, say which phoneme it is an allophone of, and justify your answer.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Chapter 2: Morphology

2.1 Directions for Solving Problems

Just as in phonology we are interested in the variant forms of phonemes (the allophones) and the distribution of those variants in different environments, in morphology we are interested in the variant forms of morphemes (the allomorphs) and the distribution of those variants in different environments. Those environments might be phonological or morphological; in other words, they might be determined by neighboring sounds (regardless of the morphemes those sounds are in) or by neighboring morphemes. Your task in most of these exercises is to identify the morphemes, their allomorphs, and the distribution of those allomorphs. You may assume that language data is provided in phonemic notation.

In terms of notation, morphemes are presented in curly braces. They may be written in phonemic form (with or without slashes) or orthographic form. For example, { wide } { wajd } { /wajd/ } are all acceptable representations of the same English morpheme. Allomorphs are usually written phonemically, but may be written orthographically if confusion will not result. Thus we can say that { wide } has two allomorphs, /wajd/ (as in wide, widen) and /wɪd/ (as in width).

2.1.1 How to do Morphological Analysis

Separate (or segment) the words into meaningful units. Look for complementary distribution that allows you to assign different units to a single morpheme. For example, /tʃajld/ occurs in the word child and /tʃɪld-/ occurs in the word children. We can identify these two forms as allomorphs of a single morpheme { child }, the latter occurring before /rɛn/. In turn, /rɛn/ can be identified as an allomorph of { plural -s } that occurs after the root { child }.

Sometimes our morphological analysis involved identifying the morphological classes into which a set of words can be divided. The members of a morphological class all have a particular morphological behavior in common. For example, we might place in one morphological class all English nouns that take the plural allomorph /-s/, and place in a second morphological class all English nouns that take the plural allomorph /-z/. The nouns book, hat, polyp would belong to the first class, and the nouns bug, braid, crab to the second. As a second example, we might try to identify the morphological classes of English verbs according to their behavior when inflected for the past tense. We might put in the first class all those verbs that have no distinct allomorph when inflecting for the past tense, and in the second class those that have a distinct allomorph involving a changed vowel. In the first class we would place talk (cf. talked), live (cf. lived), and chew (cf. chewed). We could call this class the regular verbs. In the second class we would place sing (cf. sang), dive (cf. dove), and stick (cf. stuck).

As the two examples above show, we can identify morphological classes of a set of words or morphemes by two different kinds of morphological behavior. One is the alternation patterns found in the allomorphs of the words or morphemes themselves (as in the English
verbs and their past tense forms). The second is according to which allomorphs of other morphemes attach to them (as in the English nouns and their plural forms).

2.1.2 Example: English Nominal Derivatives in -th

There is a set of adjectives in English to which the suffix [θ] (spelled th) can be added, deriving a noun meaning ‘state of (adj.)’. The same nominalizing suffix can also be added to some verbs. For example:

<table>
<thead>
<tr>
<th>Adjective/Verb</th>
<th>Derived Noun</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. broad</td>
<td>breadth</td>
</tr>
<tr>
<td>2. dear</td>
<td>dearth</td>
</tr>
<tr>
<td>3. deep</td>
<td>depth</td>
</tr>
<tr>
<td>4. gird (verb)</td>
<td>girth</td>
</tr>
<tr>
<td>5. high</td>
<td>height</td>
</tr>
<tr>
<td>6. long</td>
<td>length</td>
</tr>
<tr>
<td>7. true</td>
<td>truth</td>
</tr>
<tr>
<td>8. steal (verb)</td>
<td>stealth</td>
</tr>
<tr>
<td>9. warm</td>
<td>warmth</td>
</tr>
<tr>
<td>10. wide</td>
<td>width</td>
</tr>
</tbody>
</table>

1. Perform a morphological analysis of this data: identify all of the morphemes, and describe the shape and distribution of their allomorphs.

**Solution 1**: The noun-deriving suffix { -th } has the single allomorph /θ/, which occurs unconditionally. Most of the adjective and verb roots have different allomorphs that occur before { -th }.

**Solution 2**: The noun-deriving suffix { -th } has two allomorphs: /θ/ occurs after { high }, and /θ/ occurs elsewhere. Most of the adjective and verb roots have different allomorphs that occur before { -th }.

The allomorphs of the roots are listed below. Allomorphs of { high } will be described differently depending on whether we apply solution 1 or solution 2.

<table>
<thead>
<tr>
<th>Morpheme</th>
<th>Allomorph In Isolation</th>
<th>Allomorph Before { -th }</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. { broad }</td>
<td>/bɹo*d/</td>
<td>/bɹɛdθ/</td>
</tr>
<tr>
<td>2. { dear }</td>
<td>/diɹ/</td>
<td>/dɹθ/</td>
</tr>
<tr>
<td>3. { deep }</td>
<td>/dip/</td>
<td>/dɛpθ/</td>
</tr>
<tr>
<td>4. { gird (verb) }</td>
<td>/gɹd/</td>
<td>/gɹθ/</td>
</tr>
<tr>
<td>5. { high }</td>
<td>/haj/</td>
<td>(1) /hajt- / (2) /haj-/</td>
</tr>
</tbody>
</table>

1 Some speakers use the form /hajt/.
2.2 Morphology Exercises

Terminology

When doing the exercises in this section, it will be helpful to have a basic understanding of some of the more common terms referring to various grammatical categories. Look up and briefly define the following terms. You may use any reference that is available, but be sure you are providing a definition appropriate to the field of linguistics.

infinitive

imperative

causative

hortative

transitive

intransitive

gerund

2.2.1 Indonesian Numeral Classifiers

2.2.2 Ainu Causative Verb Formation

1. Where is Ainu spoken, and to what language family does it belong?

The following data are from the Shizunai dialect of Ainu. Analyze the morphology of
causative verb formation based on the data. The data are phonemic; slashes have been omitted for typographic convenience here and in subsequent exercises.

<table>
<thead>
<tr>
<th>Verb Stem</th>
<th>Gloss</th>
<th>Causative Verb</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. kore</td>
<td>‘give’</td>
<td>korere</td>
<td>‘make s.o. give’</td>
</tr>
<tr>
<td>2. epakasnu</td>
<td>‘teach’</td>
<td>epakasnure</td>
<td>‘make s.o. teach/tell’</td>
</tr>
<tr>
<td>3. nu</td>
<td>‘hear’</td>
<td>nure</td>
<td>‘tell’</td>
</tr>
<tr>
<td>4. e</td>
<td>‘eat’</td>
<td>ere</td>
<td>‘serve (food)’</td>
</tr>
<tr>
<td>5. hopuni</td>
<td>‘get up’</td>
<td>hopunire</td>
<td>‘wake s.o.’</td>
</tr>
<tr>
<td>6. nukar</td>
<td>‘see’</td>
<td>nukare</td>
<td>‘show’</td>
</tr>
<tr>
<td>7. kor</td>
<td>‘have’</td>
<td>kore</td>
<td>‘give’</td>
</tr>
<tr>
<td>8. kar</td>
<td>‘make’</td>
<td>kare</td>
<td>‘make s.o. make’</td>
</tr>
<tr>
<td>9. ek</td>
<td>‘come’</td>
<td>ekte</td>
<td>‘make s.o. come’</td>
</tr>
<tr>
<td>10. ahup</td>
<td>‘enter’</td>
<td>ahupte</td>
<td>‘make s.o. enter’</td>
</tr>
<tr>
<td>11. wen</td>
<td>‘be bad’</td>
<td>wente</td>
<td>‘destroy, ruin’</td>
</tr>
<tr>
<td>12. rikip</td>
<td>‘ascend’</td>
<td>rikipte</td>
<td>‘make s.o. ascend’</td>
</tr>
</tbody>
</table>

2. List all the allomorphs of the causative suffix in this dialect of Ainu.

3. Is the distribution of these allomorphs conditioned phonologically? If so, explain the phonological environments in which they occur.

### 2.2.3 Korean Subject Markers

The Korean nouns below are all marked as subjects.

<table>
<thead>
<tr>
<th>Noun</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ʧoŋika</td>
<td>‘paper’</td>
</tr>
<tr>
<td>2. peka</td>
<td>‘boat’</td>
</tr>
<tr>
<td>3. ulika</td>
<td>‘we’</td>
</tr>
<tr>
<td>4. jaŋaka</td>
<td>‘English’</td>
</tr>
<tr>
<td>5. namuka</td>
<td>‘tree’</td>
</tr>
<tr>
<td>6. ʧʰaka</td>
<td>‘car’</td>
</tr>
<tr>
<td>7. hakkjoka</td>
<td>‘school’</td>
</tr>
<tr>
<td>8. pali</td>
<td>‘foot’</td>
</tr>
<tr>
<td>9. toṣkwani</td>
<td>‘library’</td>
</tr>
<tr>
<td>10. haksẹŋi</td>
<td>‘student’</td>
</tr>
<tr>
<td>11. ʧipi</td>
<td>‘house’</td>
</tr>
<tr>
<td>12. ikasi</td>
<td>‘this thing’</td>
</tr>
<tr>
<td>13. multi</td>
<td>‘water’</td>
</tr>
<tr>
<td>14. sauli</td>
<td>‘Seoul’</td>
</tr>
</tbody>
</table>

1. Identify the allomorphs of the subject marker, and describe their distribution.
2.2.4 Kannada Infinitives

Consider the following data from Kannada. The infinitive form of the verb is derived by affixing an infinitive morpheme to the verb stem, which is in most cases (including those listed below) identical to the non-polite imperative form of the verb. Your task is to analyze the morphology of the verb stems and the infinitive affix.

<table>
<thead>
<tr>
<th>Imperative</th>
<th>Gloss</th>
<th>Infinitive</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>ba:</td>
<td>'come'</td>
<td>baralu</td>
<td>'to come'</td>
</tr>
<tr>
<td>ho:gu</td>
<td>'go'</td>
<td>ho:galu</td>
<td>'to go'</td>
</tr>
<tr>
<td>ma:ḍu</td>
<td>'make'</td>
<td>ma:ḍalu</td>
<td>'to make'</td>
</tr>
<tr>
<td>to:rsu</td>
<td>'show'</td>
<td>to:rsalu</td>
<td>'to show'</td>
</tr>
<tr>
<td>no:ḍu</td>
<td>'see'</td>
<td>no:ḍalu</td>
<td>'to see'</td>
</tr>
<tr>
<td>ku:t-kollu</td>
<td>'sit'</td>
<td>ku:t-kollalu</td>
<td>'to sit'</td>
</tr>
<tr>
<td>se:ru</td>
<td>'meet'</td>
<td>se:ralu</td>
<td>'to meet'</td>
</tr>
<tr>
<td>kollu</td>
<td>'kill'</td>
<td>kollalu</td>
<td>'to kill'</td>
</tr>
<tr>
<td>ka:ṇu</td>
<td>'seem'</td>
<td>ka:ṇalu</td>
<td>'to seem'</td>
</tr>
<tr>
<td>a:gu</td>
<td>'become'</td>
<td>a:galu</td>
<td>'to become'</td>
</tr>
<tr>
<td>iru</td>
<td>'be'</td>
<td>iralu</td>
<td>'to be'</td>
</tr>
<tr>
<td>ha:ku</td>
<td>'put'</td>
<td>ha:kalu</td>
<td>'to put'</td>
</tr>
<tr>
<td>bi:ḍu</td>
<td>'leave'</td>
<td>bi:ḍalu</td>
<td>'to leave'</td>
</tr>
<tr>
<td>ku:ḍi</td>
<td>'drink'</td>
<td>ku:ḍijalu</td>
<td>'to drink'</td>
</tr>
<tr>
<td>kali</td>
<td>'study'</td>
<td>kali:jlalu</td>
<td>'to study'</td>
</tr>
</tbody>
</table>

1. Are there allomorphs of the verb stem that are used in the formation of the infinitive? If so, describe the allomorphs.

2. How many allomorphs does the Kannada infinitive suffix have? What is their
2.2.5 Japanese Verbal Morphology

The first column contains positive polite forms of Japanese verbs. The second column contains plain negative forms of the same verbs. Both are formed by the addition of suffixes to a verb root. Your task is to arrive at the simplest morphological explanation that accounts for this data. (Note that phonemic /u/ is realized phonetically as [ɯ].)

<table>
<thead>
<tr>
<th>Polite positive</th>
<th>Gloss</th>
<th>Plain negative</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. sakimasu</td>
<td>‘bloom’</td>
<td>sakanai</td>
<td>‘not bloom’</td>
</tr>
<tr>
<td>2. kakimasu</td>
<td>‘write’</td>
<td>kakanai</td>
<td>‘not write’</td>
</tr>
<tr>
<td>3. nomimasu</td>
<td>‘drink’</td>
<td>nomanai</td>
<td>‘not drink’</td>
</tr>
<tr>
<td>4. imasu</td>
<td>‘be, exist’</td>
<td>inai</td>
<td>‘not exist’</td>
</tr>
<tr>
<td>5. mimasu</td>
<td>‘see’</td>
<td>minai</td>
<td>‘not see’</td>
</tr>
<tr>
<td>6. suimasu</td>
<td>‘suck’</td>
<td>suwanai</td>
<td>‘not suck’</td>
</tr>
<tr>
<td>7. aimasu</td>
<td>‘meet’</td>
<td>awanai</td>
<td>‘not meet’</td>
</tr>
<tr>
<td>8. kaimasu</td>
<td>‘buy’</td>
<td>kawanai</td>
<td>‘not buy’</td>
</tr>
<tr>
<td>9. kawakimasu</td>
<td>‘dry’</td>
<td>kawakanai</td>
<td>‘not dry’</td>
</tr>
</tbody>
</table>

1. Identify the polite positive and plain negative verb suffixes, and list all the allomorphs of each.

2. Identify the verb root morphemes and any allomorphs. Group the verbs into classes according to their patterns of allomorphy. An analysis that is as general as possible, i.e. that results in the smallest number of classes, is preferred.
3. Based on your analysis, provide the root and the negative form of the following polite positive verbs:

a. **fukimasu** ‘wipe’
   root: __________
   ‘not wipe’: __________

b. **makimasu** ‘roll up’
   root: __________
   ‘not roll up’: __________

c. **ojogimasu** ‘swim’
   root: __________
   ‘not swim’: __________

### 2.2.6 Ainu Transitive Verb Formation

### 2.2.7 Bengali Verb-Tense Morphology

### 2.2.8 Tamil Echo-Word Reduplication

The expressions in the second column differ from the words in the first column in having the meaning ‘… and similar things’. The derivation of these expressions is productive—that is, native speakers can continue to create new expressions in this way. Analyze the morphological system that derives the expressions from the base words. For this exercise, you may assume that the base words consist of a single morpheme. (Note: ṛ represents a voiced retroflex approximant, IPA [ɻ]. This is the sound represented by l in the Romanized spelling of the word Tamil.)

<table>
<thead>
<tr>
<th>Base Word</th>
<th>Gloss</th>
<th>Derived Form</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. kaːppi</td>
<td>‘coffee’</td>
<td>kaːppi kiːppi</td>
<td>‘coffee and other beverages’</td>
</tr>
<tr>
<td>2. puli</td>
<td>‘tiger’</td>
<td>puli kili</td>
<td>‘tigers and other animals’</td>
</tr>
<tr>
<td>3. poːjtṭu</td>
<td>‘going’</td>
<td>poːjtṭu kiːṭṭu</td>
<td>‘going and other activities’</td>
</tr>
<tr>
<td>4. veːle</td>
<td>‘work’</td>
<td>veːle kiːle</td>
<td>‘work and other tasks’</td>
</tr>
<tr>
<td>5. paːṛam</td>
<td>‘fruit’</td>
<td>paːṛam kiram</td>
<td>‘fruit and other perishables’</td>
</tr>
<tr>
<td>6. koːjil</td>
<td>‘temple’</td>
<td>koːjil kiram</td>
<td>‘temples and other buildings’</td>
</tr>
<tr>
<td>7. paraṭṭe</td>
<td>(an epithet)</td>
<td>paraṭṭe kiraṭṭe</td>
<td>‘epithets and other aspersions’</td>
</tr>
<tr>
<td>8. tandram</td>
<td>‘plan’</td>
<td>tandram kindram</td>
<td>‘plans and other plots’</td>
</tr>
<tr>
<td>9. kuppe</td>
<td>‘garbage’</td>
<td>kuppe kippe</td>
<td>‘garbage and other trash’</td>
</tr>
<tr>
<td>10. guṇam</td>
<td>‘character’</td>
<td>guṇam kinam</td>
<td>‘character and other qualities’</td>
</tr>
</tbody>
</table>

1. Describe the morphological process by which the expressions are derived. Your description should be in terms of combinations of morphemes. Identify all of the morphemes
involved, and their allomorphs.

<table>
<thead>
<tr>
<th>Group A</th>
<th>Gloss</th>
<th>Group B</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. tʃoŋiwa</td>
<td>‘paper and’</td>
<td>tʃoŋilo</td>
<td>‘with paper’</td>
</tr>
<tr>
<td>2. namuwa</td>
<td>‘trees and’</td>
<td>namulo</td>
<td>‘of wood’</td>
</tr>
<tr>
<td>3. tʃipkwa</td>
<td>‘house and’</td>
<td>tʃipoulo</td>
<td>‘to the house’</td>
</tr>
<tr>
<td>4. mulkwa</td>
<td>‘water and’</td>
<td>mullo</td>
<td>‘with water’</td>
</tr>
<tr>
<td>5. iktkwa</td>
<td>‘this thing and’</td>
<td>iksulo</td>
<td>‘with this thing’</td>
</tr>
<tr>
<td>6. hakšeŋkwa</td>
<td>‘student and’</td>
<td>hakšeŋulo</td>
<td>‘as a student’</td>
</tr>
<tr>
<td>7. səulkwa</td>
<td>‘Seoul and’</td>
<td>səullo</td>
<td>‘to Seoul’</td>
</tr>
<tr>
<td>8. tʃaawa</td>
<td>‘car and’</td>
<td>tʃalo</td>
<td>‘by car’</td>
</tr>
<tr>
<td>9. kʰalkwa</td>
<td>‘knife and’</td>
<td>kʰallo</td>
<td>‘with a knife’</td>
</tr>
<tr>
<td>10. natkwa</td>
<td>‘sickle and’</td>
<td>nasulo</td>
<td>‘with a sickle’</td>
</tr>
<tr>
<td>11. hankulkwə</td>
<td>‘Korean alphabet and’</td>
<td>hankullo</td>
<td>‘in the Korean alphabet’</td>
</tr>
<tr>
<td>12. pəsuwa</td>
<td>‘bus and’</td>
<td>pəsulo</td>
<td>‘by bus’</td>
</tr>
<tr>
<td>13. nalkwa</td>
<td>‘day and’</td>
<td>nallo</td>
<td>‘daily’</td>
</tr>
<tr>
<td>14. hakkjowa</td>
<td>‘school and’</td>
<td>hakkjolo</td>
<td>‘to school’</td>
</tr>
<tr>
<td>15. tosəkwankwə</td>
<td>‘library and’</td>
<td>tosəkwulu</td>
<td>‘to the library’</td>
</tr>
<tr>
<td>16. jəŋawa</td>
<td>‘English and’</td>
<td>jəŋalo</td>
<td>‘in English’</td>
</tr>
<tr>
<td>17. pətkwa</td>
<td>‘foot and’</td>
<td>pallo</td>
<td>‘with the foot’</td>
</tr>
<tr>
<td>18. pətkwa</td>
<td>‘comb and’</td>
<td>pəsulo</td>
<td>‘with a comb’</td>
</tr>
</tbody>
</table>

1. State the distribution of the allomorphs /-kwa/ and /-wa/ in the Group A forms in terms of phonological environment.
2. Identify and name the clitic morpheme in the Group B forms, identify its allomorphs, and state their distribution. Are the conditioning environments phonological or morphological?

3. Some of the noun stems show an alternation in their stem-final consonant. (In other words, some of the stems have two allomorphs which differ in the final consonant.) By comparing the corresponding forms in Groups A and B, identify these stems and state the nature of the alternation and the conditioning factors.

2.2.10 Telugu Future-Habitual and Hortative

2.2.11 Japanese Gerunds

Among the many forms that Japanese verbs can take, there is an important set that are sometimes called gerunds. These are noun-like forms of verbs that are used for many different purposes in the language. Because of the wide variety of usages, they are difficult to translate simply into English in the absence of context. For our purposes we will simply gloss them with English words ending in -ing. In addition to the gerunds, the informal and formal forms of the verbs are listed as well.

<table>
<thead>
<tr>
<th>Gloss</th>
<th>Informal Form</th>
<th>Formal Form</th>
<th>Gerund</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>‘write’</td>
<td>kaku</td>
<td>kakimasu</td>
</tr>
<tr>
<td>2.</td>
<td>‘drink’</td>
<td>nomu</td>
<td>nomimasu</td>
</tr>
</tbody>
</table>
3. ‘walk’ aruku arukimasu aruite ‘walking’
4. ‘play’ asobu asobimasu asonde ‘playing’
5. ‘smell’ kagu kagimasu kaide ‘smelling’
6. ‘hurry’ isogu isogimasu isoide ‘hurrying’
7. ‘blow’ huku hukimasu huite ‘blowing’
8. ‘points’ sasu sasimasu sasite ‘pointing’
9. ‘win’ katu katimasu katte ‘winning’
10. ‘die’ sinu sinimasu sinde ‘dying’

1. The gerunds are formed by suffixing a morpheme to a verb stem. What are the allomorphs of the suffix, and what conditions their occurrence? (Bear in mind as you answer this problem that the verb stems may have allomorphs as well.)

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

2. In answering the previous question, you may have discovered that some of the verb stems involved have several allomorphs. Which stems have different allomorphs, and what are they?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

3. Based on your answer to the previous question, how many different classes would you divide these verbs up into? Group the verbs into classes according to their patterns of allomorphy. How can you define each class?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
2.2.12 Tamil Case

2.2.13 Japanese Gerunds (II)

2.2.14 Kannada Negative Formation

2.2.15 Kannada Contingent, Past, and Present

2.2.16 Sinhala Noun Plurals

2.2.17 Korean Numeral Classifiers

2.2.18 Brahui Verb Conjugation

1. Where is Brahui spoken, and to what language family does it belong?

2. Based on the data, identify a verb stem for each verb, and write them to left of each line

<table>
<thead>
<tr>
<th>Gloss</th>
<th>Infinitive</th>
<th>Imperative (2p sg)</th>
<th>Past (3p sg)</th>
<th>Prohibitive (2p sg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ‘leave’</td>
<td>illiŋ</td>
<td>illa</td>
<td>illā</td>
<td>illipa</td>
</tr>
<tr>
<td>2. ‘devastate’</td>
<td>bēliŋ</td>
<td>bēla</td>
<td>bēlā</td>
<td>bēlipa</td>
</tr>
<tr>
<td>3. ‘distinguish’</td>
<td>birriŋ</td>
<td>birra</td>
<td>birrā</td>
<td>birripa</td>
</tr>
<tr>
<td>4. ‘crack’</td>
<td>tšaliŋ</td>
<td>tšala</td>
<td>tšalā</td>
<td>tšalipa</td>
</tr>
<tr>
<td>5. ‘lick’</td>
<td>tšaṭṭiŋ</td>
<td>tšaṭṭa</td>
<td>tšaṭṭā</td>
<td>tšaṭṭipa</td>
</tr>
<tr>
<td>6. ‘lose’</td>
<td>goiŋ</td>
<td>goa</td>
<td>goā</td>
<td>goipa</td>
</tr>
<tr>
<td>7. ‘cover’</td>
<td>hāliŋ</td>
<td>hāla</td>
<td>hālā</td>
<td>hālipa</td>
</tr>
<tr>
<td>8. ‘win’</td>
<td>kaṭṭiŋ</td>
<td>kaṭṭa</td>
<td>kaṭṭā</td>
<td>kaṭṭipa</td>
</tr>
<tr>
<td>9. ‘grind’</td>
<td>nusiŋ</td>
<td>nusa</td>
<td>nusā</td>
<td>nusipa</td>
</tr>
<tr>
<td>10. ‘uproot’</td>
<td>loṛiŋ</td>
<td>loṛa</td>
<td>loṛā</td>
<td>loṛipa</td>
</tr>
<tr>
<td>11. ‘rot’</td>
<td>saṛiŋ</td>
<td>saṛa</td>
<td>saṛā</td>
<td>saṛipa</td>
</tr>
<tr>
<td>12. ‘agree’</td>
<td>ťahiŋ</td>
<td>ťaha</td>
<td>ťahā</td>
<td>ţahipa</td>
</tr>
<tr>
<td>13. ‘buzz’</td>
<td>Žuṇiŋ</td>
<td>Žuṇa</td>
<td>Žuṇā</td>
<td>Žuṇipa</td>
</tr>
<tr>
<td>14. ‘squeeze’</td>
<td>piḷiŋ</td>
<td>piḷa</td>
<td>piḷā</td>
<td>piḷipa</td>
</tr>
<tr>
<td>15. ‘drive out’</td>
<td>miṟiŋ</td>
<td>miṟa</td>
<td>miṟā</td>
<td>miṟipa</td>
</tr>
<tr>
<td>16. ‘swell’</td>
<td>yaḥṣiŋ</td>
<td>yaḥṣa</td>
<td>yaḥṣā</td>
<td>yaḥṣipa</td>
</tr>
</tbody>
</table>
of data. Note any allomorphs of the stems.

3. Describe the formation of the infinitive, imperative, past, and prohibitive forms in terms of the morphemes and allomorphs that are involved.

________________________________________________________________________
________________________________________________________________________

4. How many classes of verbs are illustrated by this data?

________________________________________________________________________

2.2.19 Brahui Past Stem Conjugation

2.2.20 Khmer Causative Verb Conjugation

1. Where is Khmer spoken, and to what language family does it belong?

________________________________________________________________________

Khmer has a number of prefixes that are added to verbal bases to derive causative verbs (or other kinds of derived verbs). In the data below, tone marks have been omitted for simplicity.

<table>
<thead>
<tr>
<th>Simple Verb</th>
<th>Gloss</th>
<th>Derived Verb</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. riaj</td>
<td>to be scattered</td>
<td>pra:j</td>
<td>to scatter</td>
</tr>
<tr>
<td>2. rion</td>
<td>to learn</td>
<td>prion</td>
<td>to teach</td>
</tr>
<tr>
<td>3. ɲu:t</td>
<td>to bathe (intr.)</td>
<td>pʰɲo:t</td>
<td>to bathe</td>
</tr>
<tr>
<td>4. can</td>
<td>to be defeated</td>
<td>pʰcaɲ</td>
<td>to defeat</td>
</tr>
<tr>
<td>5. de:k</td>
<td>to go to bed</td>
<td>pʰdeː:k</td>
<td>to bed</td>
</tr>
<tr>
<td>6. ruam</td>
<td>to gather (intr.)</td>
<td>pʰruam</td>
<td>to round up</td>
</tr>
<tr>
<td>7. ɲoas</td>
<td>to hatch</td>
<td>pʰɲoas</td>
<td>to hatch</td>
</tr>
<tr>
<td>8. cut</td>
<td>to close (intr.)</td>
<td>pʰcut</td>
<td>to join</td>
</tr>
<tr>
<td>9. cum</td>
<td>to unite (intr.)</td>
<td>pracum</td>
<td>to unite</td>
</tr>
<tr>
<td>10. beh</td>
<td>to pick</td>
<td>prabeh</td>
<td>to keep on</td>
</tr>
<tr>
<td>11. kʰam</td>
<td>to bite</td>
<td>prakʰam</td>
<td>to bite one</td>
</tr>
<tr>
<td>12. mːj</td>
<td>to look</td>
<td>prəmaːj</td>
<td>to estimate</td>
</tr>
<tr>
<td>13. hav</td>
<td>to fly (intr.)</td>
<td>boŋhav</td>
<td>to fly</td>
</tr>
<tr>
<td>14. kʰos</td>
<td>to be in error</td>
<td>boŋkʰos</td>
<td>to cause a</td>
</tr>
</tbody>
</table>

30
15. koəp  to be pleased  bəŋkoəp  to please
16. coːl  to enter  bəŋcoːl  to cause to enter
17. toːc  to be small  bontöːc  to diminish in power
18. doh  to grow (intr.)  bəndoh  to plant
19. bak  to be broken  bømbak  to break (tr.)

2. List all of the allomorphs of the causative prefix. Are any of the allomorphs conditioned predictably by the environment?
______________________________________________________________
______________________________________________________________

3. Which verbs have different allomorphs that occur with the causative prefix? List all of the allomorphs.
______________________________________________________________
______________________________________________________________

4. How many classes of verbs should be established to account for this data? Define the classes, and say which verbs are in each class.
______________________________________________________________
______________________________________________________________
______________________________________________________________
______________________________________________________________
Chapter 3: Morphophonology

3.1 Directions for Solving Problems

3.2 Morphophonology Exercises
Chapter 4: Syntax

4.1 Directions for Solving Problems

In these problems you will be asked to analyze sentences in order to determine their syntactic structure. In some cases you will be asked to draw trees indicating that structure; in other cases you will be asked to describe transformations that derive one type of sentence from another; and in other cases you will be asked to describe the relationship between syntax and inflectional forms. In all cases the sentences are presented as sequences of words separated by spaces. You may assume that the words are presented in phonemic notation unless otherwise stated.

If you are asked to describe the syntax of a linguistic structure, this means identifying the words involved, specifying the order in which they occur, and indicating what kinds of inflection and agreement are found, if any.

The best approach to these problems is to first identify the meaning of as many of the words as possible by comparing the sentences with their English meanings. The second thing to do is to compare pairs of sentences that are minimally different in meaning (for example, a positive form with a negative form, or a present form with a past form, or a masculine singular form with a masculine plural form), so that you can identify the syntactic difference that correlates with the difference in meaning. The syntactic difference might involve constituent order, additional words or morphemes, or changes in agreement.

4.2 Syntax Exercises

4.2.1 Japanese Syntax

4.2.2 Tamil Case Syntax

4.2.3 Thai Syntax

The following are Thai sentences. The diacritic marks on vowels represent tones; they are not relevant to syntactic analysis. The tones are: ŋ́ high, ŋ̀ low, ŋ̌ rising, ŋ̂ falling, ŋ (unmarked) mid. There is no gender distinction in Thai third-person pronouns. The pronouns below have all been translated “she”, but they could all also mean “he”.

Begin your analysis by identifying the meaning or function of as many words as possible.

<table>
<thead>
<tr>
<th>Thai Sentence</th>
<th>English Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. kʰáw pen kʰruː</td>
<td>She is a teacher.</td>
</tr>
<tr>
<td>2. kʰáw pen kʰruː tʰáj máj</td>
<td>She is a teacher, isn’t she?</td>
</tr>
</tbody>
</table>
3. kʰáw pen kʰru: rə² You mean she’s a teacher?
4. kʰáw mâj tʰâj kʰru: She’s not a teacher.
5. kʰáw mâj tʰâj kʰru: rə You mean she’s not a teacher?
6. kʰun pen tʰâhân tʰâj mâj You’re a soldier, aren’t you?
7. kʰun pen tʰâhân rə You mean you’re a soldier?
8. kʰun mâj tʰâj tʰâhân rə You mean you’re not a soldier?
9. tʰâhân pen kʰru: The soldier is a teacher.
10. kʰru: pen tʰâhân tʰâj mâj You mean the soldier is a teacher?
11. tʰâhân mâj tʰâj kʰru: The soldier is not a teacher.
12. kʰru: mâj tʰâj tʰâhân rə You mean the teacher isn’t a soldier?
13. kʰáw di: She is good.
14. tʰâhân kèŋ The soldier is clever.
15. kʰun di: mâj Are you good?
16. kʰru: di: rə You mean the teacher is good?
17. kʰáw mâj kèŋ She isn’t clever.
18. kʰáw mâj kèŋ rə You mean she isn’t clever?
19. tʰâhân mâj di: rə You mean the soldier isn’t good?
20. kʰru: mâj dii tʰâj mâj The teacher isn’t good, is she?
21. tʰâhân kèŋ tʰâj mâj The soldier is clever, isn’t she?

1. Is there a copular verb (i.e. a verb meaning “to be”) in Thai? If so, what is it?

2. Describe the syntax of the positive declarative copular sentence (“A is B”) in Thai. In other words, what are the words involved, and in what order do they occur?

3. Describe the syntax of the positive declarative sentence that a subject possesses a quality (e.g. “Subj. is good”, “Subj. is clever”) in Thai.

4. How is negation expressed in Thai syntax? What rule can you propose to convert a positive sentence into a negative one? (*Hint*: You might need different rules for different types of sentences.)

5. What kinds of inflection are found in this data?

6. How many different question structures are found in this data?

7. **Tag questions** in English are questions of the form “Statement, is(n’t) he/she/it?”. They

² Note that this syllable has a number of possible pronunciations, including rə, la, ri, and li in various tones.
³ Here “you mean” in the English translation is meant to express intense curiosity as part of a follow-up question requesting more information.
are questions that convey an assumption that the statement is correct. For example, if I ask “Today is Wednesday, isn’t it?” I am indicating that I assume that today is Wednesday. How are tag questions formed in Thai?

8. What are the semantic and syntactic differences between máj and ra? In other words, how do they differ in meaning and how do they differ in their structural role in sentence formation?

9. Extra Credit: Does it appear that Thai has a distinct adjective part of speech, or that adjectives are a type of verb? Explain.
### 4.2.4 Hindi Syntax

Consider the following Hindi sentences, which all involve the verb ‘to sell’. Long vowels are indicated with a macron, e.g. [ā], or by doubling, e.g. [ūū]. y represent a palatal glide [j]. c represents an affricate [tʃ]. (The Hindi words are transcribed in a way that is not entirely phonetically accurate, but this is not relevant to the problem.)

The following abbreviations are used:

- **m.** masculine
- **f.** feminine
- **pol.** polite
- **inf.** informal
- **prox.** proximate (= near to the speaker)
- **dist.** distant (= far from the speaker)
- **sg.** singular
- **pl.** plural

Each of the sentences below begins with a personal pronoun. The remaining words are all verbs. **The last word of each sentence is a form of the present tense verb ‘to be’.** Half of the sentences contain a syntactic construction that expresses habitual action; the other half contain a syntactic construction that expresses progressive (i.e. ongoing) action.

<table>
<thead>
<tr>
<th>Hindi Sentence</th>
<th>English Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. māĩ bectā ĕũũ</td>
<td>I (m.) habitually sell.</td>
</tr>
<tr>
<td>2. māĩ bectī ĕũũ</td>
<td>I (f.) habitually sell.</td>
</tr>
<tr>
<td>3. tū bectā ĕc</td>
<td>You (sg. m.) habitually sell.</td>
</tr>
<tr>
<td>4. tū bectī ĕc</td>
<td>You (sg. f.) habitually sell.</td>
</tr>
<tr>
<td>5. yah bectā ĕc</td>
<td>He (prox.) habitually sells.</td>
</tr>
<tr>
<td>6. yah bectī ĕc</td>
<td>She (prox.) habitually sells.</td>
</tr>
<tr>
<td>7. vah bectā ĕc</td>
<td>He (dist.) habitually sells.</td>
</tr>
<tr>
<td>8. vah bectī ĕc</td>
<td>She (dist.) habitually sells.</td>
</tr>
<tr>
<td>9. ham becte hāĩ</td>
<td>We (m.) habitually sell.</td>
</tr>
<tr>
<td>10. ham bectī hāĩ</td>
<td>We (f.) habitually sell.</td>
</tr>
<tr>
<td>11. tum becte ho</td>
<td>You (inf. pl. m.) habitually sell.</td>
</tr>
<tr>
<td>12. tum bectī ho</td>
<td>You (inf. pl. f.) habitually sell.</td>
</tr>
<tr>
<td>13. āp becte hāĩ</td>
<td>You (pol. pl. m.) habitually sell.</td>
</tr>
<tr>
<td>14. āp bectī hāĩ</td>
<td>You (pol. pl. f.) habitually sell.</td>
</tr>
<tr>
<td>15. ye becte hāĩ</td>
<td>They (prox. m.) habitually sell.</td>
</tr>
<tr>
<td>16. ye bectī hāĩ</td>
<td>They (prox. f.) habitually sell.</td>
</tr>
<tr>
<td>17. ve becte hāĩ</td>
<td>They (dist. m.) habitually sell.</td>
</tr>
<tr>
<td>18. ve bectī hāĩ</td>
<td>They (dist. f.) habitually sell.</td>
</tr>
<tr>
<td>19. māĩ bec rahā ĕũũ</td>
<td>I (m.) am selling.</td>
</tr>
<tr>
<td>20. māĩ bec rahī ĕũũ</td>
<td>I (f.) am selling.</td>
</tr>
</tbody>
</table>
21. tū bec rahā hẽ You (sg. m.) are selling.
22. tū bec rahī hẽ You (sg. f.) are selling.
23. yah bec rahā hẽ He (prox.) is selling.
24. yah bec rahī hẽ She (prox.) is selling
25. vah bec rahā hẽ He (dist.) is selling.
26. vah bec rahī hẽ She (dist.) is selling.
27. ham bec rahe hāĩ We (m.) are selling.
28. ham bec rahī hāĩ We (f.) are selling.
29. tum bec rahe ho You (inf. pl. m.) are selling.
30. tum bec rahī ho You (inf. pl. f.) are selling.
31. āp bec rahe hāĩ You (pol. pl. m.) are selling.
32. āp bec rahī hāĩ You (pol. pl. f.) are selling.
33. ye bec rahe hāĩ They (prox. m.) are selling.
34. ye bec rahī hāĩ They (prox. f.) are selling.
35. ve bec rahe hāĩ They (dist. m.) are selling.
36. ve bec rahī hāĩ They (dist. f.) are selling.

1. Based on the data above, what appears to be the root (or stem) of the verb ‘to sell’?
2. What are the various forms of the present tense of ‘to be’? What meanings do they have? (Your answer to the second part of this question should specify such things as person, number, gender, proximate/distal, and informal/polite, as relevant.)
3. What affix is used to indicate habituality? Does this morpheme have allomorphs?
4. What morpheme indicates progressivity? Does this morpheme have allomorphs?
5. What are the morphemes for the various Hindi personal pronouns? How does the pronominal system compare with that of English?
6. Describe the syntax of the habitual verbal construction, i.e. what are the words involved, how are they inflected, and in what order are they put together to form a phrase?
7. Describe the syntax of the progressive (“-ing”) verbal construction.
8. Can separate morphemes be established for inflections ‘singular’, ‘plural’, ‘masculine’, ‘feminine’ on all of the verbs that inflect? If so, list them. If not, what meanings can be established for the inflectional affixes?
9. What rules of agreement can be stated about verbs in Hindi? (Agreement refers to inflectional changes that one word, such as a verb, undergoes in a way that is conditioned by the presence of certain forms of other words (such as pronouns) in the sentence. For example, we say that in English ‘She eats,’ ‘eats’ agrees with the third-person singular subject ‘she’.)

4 Pronominal is the adjective form of pronoun.
verbs agree with subject pronouns in all three of person, number, and gender? When more than one verb is present in the sentence, do all of them inflect to agree with the pronouns, or just some of them?
Chapter 5: Historical Linguistics

5.1 Directions for Solving Problems

The problems in this section present data that illustrate historical changes in various languages or language families. Some of the examples are from hypothetical languages or language families. Others are from real languages and language families, although in some cases the data have been regularized or otherwise simplified. Your task is to reconstruct the changes that have occurred, and to propose hypothetical historical forms (called proto-forms, marked with an *) from which the later forms have developed. In all cases you will look for cognate forms and extract from them regular sound correspondences.

Once you have reconstructed a set of proto-phonemes from which these regular sound correspondences derive, you will be asked to specify the nature of the sound changes that have taken place in each language. Among the types of changes you are likely to encounter are voicing or devoicing of consonants, palatalization, deletion, lowering, raising, fronting, backing, metathesis, gemination (i.e. lengthening of consonants), nasalization, etc.

5.2 Historical Linguistics Exercises

5.2.1 South Dravidian

Examine the following cognate sets from the two Dravidian languages Kannada and Tamil. (Note: \( r \) represents a voiced retroflex approximant, IPA [ɻ].)

<table>
<thead>
<tr>
<th>Tamil</th>
<th>Kannada</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. puli</td>
<td>huli</td>
<td>‘tiger’</td>
</tr>
<tr>
<td>2. ( \text{paː}m\text{ũ} )</td>
<td>haːwu</td>
<td>‘snake’</td>
</tr>
<tr>
<td>3. pattu</td>
<td>hattu</td>
<td>‘ten’</td>
</tr>
<tr>
<td>4. pejar</td>
<td>hesaru</td>
<td>‘name’</td>
</tr>
<tr>
<td>5. ( \text{paː}l\text{ũ} )</td>
<td>haːlu</td>
<td>‘milk’</td>
</tr>
<tr>
<td>6. puː</td>
<td>huː</td>
<td>‘flower’</td>
</tr>
<tr>
<td>7. ( \text{per}\text{ũ}k\text{ũ} )</td>
<td>heppu</td>
<td>‘curdled milk’</td>
</tr>
<tr>
<td>8. uppũ</td>
<td>uppu</td>
<td>‘salt’</td>
</tr>
<tr>
<td>9. alappũ</td>
<td>alapu</td>
<td>‘confusion’ (Tamil); ‘fatigue’ (Kannada)</td>
</tr>
<tr>
<td>10. appaː</td>
<td>appaː</td>
<td>‘father’</td>
</tr>
<tr>
<td>11. ippai</td>
<td>ippe</td>
<td>‘kind of tree’</td>
</tr>
<tr>
<td>12. ( \text{e}r\text{ũ}p\text{u}t\text{ũ} )</td>
<td>eppatu</td>
<td>‘seventy’</td>
</tr>
<tr>
<td>13. oppũ</td>
<td>oppu</td>
<td>‘agree’</td>
</tr>
<tr>
<td>14. katappũ</td>
<td>kadapu</td>
<td>‘cheek’</td>
</tr>
</tbody>
</table>
15. tappu  tappu  ‘mistake’

Assume that these two languages are descended from a common ancestor, Proto-South-Dravidian.

1. In the first seven words, the Tamil forms begin with /p/ and the Kannada forms begin with /h/. Yet elsewhere we see Tamil /p/ corresponding to Kannada /p/. Can the word-initial /p/ and /h/ be reconstructed as a single proto-phoneme, or must they be reconstructed as two proto-phonemes? Explain your reasons, reconstruct the proto-phonemes, and provide rules to explain the development of word-initial /p/ and /h/.

2. List all of the vowel correspondences illustrated by these cognate sets. (In this data, consider /j/ to be a consonant, not a vowel.) For each correspondence, reconstruct a proto-phoneme. Finally, provide rules for all of the sound changes that the vowels have undergone in both languages.

### 5.2.2 Hypothetical Language Family Tenmori

The following data are from daughter languages (Dalguh, Dalgui, Dalguj, Dalguk) of the hypothetical language family Tenmori. Your task is to propose reconstructions for the cognate sets, and indicate which sound changes have taken place in the development of each daughter language from the common ancestor. (Note: ṛ represents a voiced retroflex approximant, IPA [ɻ]. ttʃ represents a long [tʃ].)

<table>
<thead>
<tr>
<th>Reconstruction</th>
<th>Dalguh</th>
<th>Dalgui</th>
<th>Dalguj</th>
<th>Dalguk</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. *___________</td>
<td>koḷamu</td>
<td>kuḷḷa</td>
<td>kulam</td>
<td>ṭuka</td>
<td>‘tank’</td>
</tr>
<tr>
<td>2. *___________</td>
<td>palu</td>
<td>pallu</td>
<td>pal</td>
<td>lapu</td>
<td>‘grass’</td>
</tr>
<tr>
<td>3. *___________</td>
<td>kosu</td>
<td>kossu</td>
<td>kos</td>
<td>soku</td>
<td>‘bug’</td>
</tr>
<tr>
<td>4. *___________</td>
<td>poḷu</td>
<td>puḷḷu</td>
<td>pul</td>
<td>ṭupu</td>
<td>‘mat’</td>
</tr>
<tr>
<td>5. *___________</td>
<td>maramu</td>
<td>marra</td>
<td>maram</td>
<td>rama</td>
<td>‘tree’</td>
</tr>
<tr>
<td>6. *___________</td>
<td>āṭelamu</td>
<td>āṭilla</td>
<td>silam</td>
<td>liṭa</td>
<td>‘some’</td>
</tr>
<tr>
<td>7. *___________</td>
<td>paṇamu</td>
<td>paṇṇa</td>
<td>panam</td>
<td>ṇapa</td>
<td>‘money’</td>
</tr>
<tr>
<td>8. *___________</td>
<td>koṇandai</td>
<td>kuṇṇandai</td>
<td>kurand</td>
<td>ṛukandai</td>
<td>‘child’</td>
</tr>
<tr>
<td>9. *___________</td>
<td>erakku</td>
<td>irrakku</td>
<td>rak</td>
<td>ikaru</td>
<td>‘wing’</td>
</tr>
<tr>
<td>10. *___________</td>
<td>pokalu</td>
<td>pukkalu</td>
<td>pukal</td>
<td>kupalu</td>
<td>‘day’</td>
</tr>
<tr>
<td>11. *___________</td>
<td>otṭakamu</td>
<td>utṭaka</td>
<td>sakam</td>
<td>ukatṭa</td>
<td>‘dawn’</td>
</tr>
</tbody>
</table>

1. First, ignore the Dalguk language data in the last column. List all correspondence sets that you find in the other three languages. For each correspondence set, reconstruct a proto-phoneme. (Remember that overlapping sets in complementary distribution may reflect a single proto-phoneme!) Write the reconstructed Proto-Tenmori form to the left of each cognate set.

2. Write out a set of rules that describe the changes of the proto-phonemes into the
phonemes of Dalguh, Dulgui, and Dalguj. Be sure to specify which changes occurred in which languages.

3. Now compare the Dalguk data with the reconstructed Proto-Tenmori forms. What sound changes must be specified to account for the development of these forms?

4. Consider the two proto-forms *irattam 'blood' and *karam 'spice'. Say what forms of these words you would expect to find in all four languages.

5.2.3 Tungusic

1. Where are Tungusic languages spoken? To what larger language family do some scholars believe Tungusic belongs?

<table>
<thead>
<tr>
<th>Evenki</th>
<th>Nanai</th>
<th>Manchu</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ha:kin</td>
<td>pa:</td>
<td>faxun</td>
<td>‘liver’</td>
</tr>
<tr>
<td>2. talu</td>
<td>talo</td>
<td>tolxon</td>
<td>‘birchbark’</td>
</tr>
<tr>
<td>3. dawa-</td>
<td>daba-</td>
<td>daba</td>
<td>‘to cross (e.g. a mountain)’</td>
</tr>
<tr>
<td>4. tuyə</td>
<td>tuə</td>
<td>tuwəri</td>
<td>‘winter’</td>
</tr>
<tr>
<td>5. bi-</td>
<td>bi-</td>
<td>bi-</td>
<td>‘be’</td>
</tr>
<tr>
<td>6. kala-</td>
<td>kala-</td>
<td>xala-</td>
<td>‘exchange’</td>
</tr>
<tr>
<td>7. həmən</td>
<td>pəmən</td>
<td>fəmən</td>
<td>‘lip’</td>
</tr>
<tr>
<td>8. baka-</td>
<td>ba:-</td>
<td>baxa-</td>
<td>‘obtain, find’</td>
</tr>
<tr>
<td>9. də:r</td>
<td>dərə</td>
<td>dərə</td>
<td>‘surface’</td>
</tr>
<tr>
<td>10. dʒuga</td>
<td>dʒoа</td>
<td>dʒuwəri</td>
<td>‘summer’</td>
</tr>
<tr>
<td>11. dʒəp-</td>
<td>dʒəp-</td>
<td>dʒe-</td>
<td>‘eat’</td>
</tr>
<tr>
<td>12. goro</td>
<td>goro</td>
<td>goro</td>
<td>‘far’</td>
</tr>
<tr>
<td>13. dʒəpka</td>
<td>dʒəkpa</td>
<td>dʒəka</td>
<td>‘shore, edge’</td>
</tr>
<tr>
<td>14. tʃarki:-</td>
<td>tʃagdzən</td>
<td>ʃara-</td>
<td>‘(become) white’</td>
</tr>
<tr>
<td>15. tʃimki</td>
<td>tʃumtʃuan</td>
<td>ʃımxun</td>
<td>‘little finger’</td>
</tr>
<tr>
<td>16. dəldi:-</td>
<td>dəldʒi:-</td>
<td>dəndʒi:-</td>
<td>‘hear’</td>
</tr>
<tr>
<td>17. koldok</td>
<td>koldon</td>
<td>xoldon</td>
<td>‘cedar’</td>
</tr>
<tr>
<td>18. tʃikən</td>
<td>tʃiən</td>
<td>ʃıkə</td>
<td>‘urine’</td>
</tr>
<tr>
<td>19. bolo</td>
<td>bolo</td>
<td>bolori</td>
<td>‘autumn’</td>
</tr>
<tr>
<td>20. gərbi:</td>
<td>gərbu</td>
<td>gəbu</td>
<td>‘name’</td>
</tr>
<tr>
<td>21. gərbi:</td>
<td>gərbu</td>
<td>gəbu</td>
<td>‘name’</td>
</tr>
<tr>
<td>22. hokto</td>
<td>pokto</td>
<td>folko</td>
<td>‘fabric, garment’</td>
</tr>
</tbody>
</table>
23. tar  tāi  tərə  ‘that’
24. kaltaka  kalta:  xontoxo  ‘half’
25. tʃiməl-  tʃimə-  jima-  ‘get wet’ (Evenki form is dialectal)

2. Write out all of the correspondence sets involving word-initial consonants.

3. How many initial consonant phonemes must be reconstructed for Proto-Tungusic? Describe the sound changes that each proto-phoneme has undergone in the development of the daughter languages.

5.2.4 Chinese

The following are cognate sets from three Chinese languages: Standard Mandarin of Beijing, Wu spoken in Suzhou (near Shanghai), and Cantonese spoken in Guangzhou (near Hong Kong). We will be concerned with consonants and tones; you may ignore vowel correspondences (including w). A single superscript number represents a short tone.

<table>
<thead>
<tr>
<th>Gloss</th>
<th>(Char.)</th>
<th>Beijing</th>
<th>Suzhou</th>
<th>Guangzhou</th>
<th>Proto-Chinese Consonants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ‘capital city’</td>
<td>京</td>
<td>tʃin⁵⁵</td>
<td>tʃi⁴⁴</td>
<td>kŋ⁵⁵</td>
<td>_______</td>
</tr>
<tr>
<td>2. ‘gold’</td>
<td>金</td>
<td>tʃin⁵⁵</td>
<td>tʃi⁴⁴</td>
<td>kʊm⁵⁵</td>
<td>_______</td>
</tr>
<tr>
<td>3. ‘catty’</td>
<td>斤</td>
<td>tʃin⁵⁵</td>
<td>tʃi⁴⁴</td>
<td>kʊn⁵⁵</td>
<td>_______</td>
</tr>
<tr>
<td>4. ‘root’</td>
<td>根</td>
<td>kʊn⁵⁵</td>
<td>kʊn⁴⁴</td>
<td>kʊn⁵⁵</td>
<td>*k-n</td>
</tr>
<tr>
<td>5. ‘light (adj.)’</td>
<td>輕</td>
<td>tʃi⁵⁵</td>
<td>tʃi⁴⁴</td>
<td>hʊn⁵⁵</td>
<td>_______</td>
</tr>
<tr>
<td>6. ‘tangerine’</td>
<td>橘</td>
<td>tʃy⁵⁵</td>
<td>tʃv⁴⁴</td>
<td>kwet⁵</td>
<td>_______</td>
</tr>
<tr>
<td>7. ‘guest’</td>
<td>客</td>
<td>kʊv⁵¹</td>
<td>kʊv⁴⁴</td>
<td>hak⁵</td>
<td>_______</td>
</tr>
<tr>
<td>8. ‘carve’</td>
<td>刻</td>
<td>kʊv⁵¹</td>
<td>kʊv⁴⁴</td>
<td>hak⁵</td>
<td>_______</td>
</tr>
<tr>
<td>9. ‘rob’</td>
<td>劫</td>
<td>tʃi³⁵</td>
<td>tʃi²⁴</td>
<td>kip⁵</td>
<td>_______</td>
</tr>
<tr>
<td>10. ‘timid’</td>
<td>怯</td>
<td>tʃi⁵¹</td>
<td>tʃi⁴⁴</td>
<td>hip⁵</td>
<td>_______</td>
</tr>
<tr>
<td>11. ‘fruit’</td>
<td>果</td>
<td>kʊɔ²¹⁴</td>
<td>kʊɔ²⁵</td>
<td>kʊɔ³⁵</td>
<td>_______</td>
</tr>
</tbody>
</table>

1. The ancestor language Proto-Chinese had three possible stop endings in syllables: *-p, *-t, *-k. In this problem you will determine how many nasal endings there were in Proto-Chinese. **Hint:** The only conditioning factor involved in the development of Proto-Chinese consonant endings in these three languages is word-final position. The sound changes were otherwise unconditioned.

   a. List all the sound correspondences involving nasal endings that are found in this data, and for each set, indicate which cognate sets they appear in.

   ______________________________________
   ______________________________________

   b. How many nasal endings did Proto-Chinese have, and what were they?
c. Give sound laws for the development of the Proto-Chinese nasal endings in each of the three languages.


d. For each of the three languages, describe the developments of the three Proto-Chinese stop endings.


2a. List all the regular sound correspondences involving word-initial consonants, describe their environments, and say whether any of the correspondence sets are in complementary distribution.


b. Reconstruct the proto-language's word-initial consonants, and describe the sound changes of each initial consonant in each of the three languages.


3. Write the initial consonants and ending consonants that you have reconstructed in the column labeled “Proto-Chinese Consonants”. (This has been done for you in cognate set #4.)

4. What are the four tone correspondences exemplified by these cognate sets?

   i. ___ / ___ / ___  
   ii. ___ / ___ / ___ 
   iii. ___ / ___ / ___  
   iv. ___ / ___ / ___ 

5a. There is one pair of overlapping tone correspondences. What is it?


b. Are the members of this pair in complementary distribution? Explain your answer. (Hint: Aspiration is involved.)
c. How many proto-tones need to be reconstructed in the parent language to account for these two overlapping correspondence sets? 

d. How many proto-tones need to be reconstructed in the parent language to account for all four tone correspondences? 

6. The English word *kumquat* is borrowed from a Chinese compound made up of the two morphemes found in sets #2 and #6. Which of these three Chinese languages do you think the word is borrowed from?

---

5.2.5 Korean

Compare the following words from the Standard dialect of Korean (spoken in Seoul, the capital) and the dialect of Cheju Island, located off the southern tip of the Korean peninsula. Both dialects are descended from Middle Korean.

<table>
<thead>
<tr>
<th></th>
<th>Cheju</th>
<th>Seoul</th>
<th>Middle Korean reconstruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ‘moon’</td>
<td>tól</td>
<td>tal</td>
<td></td>
</tr>
<tr>
<td>2. ‘bridge’</td>
<td>tali</td>
<td>tali</td>
<td></td>
</tr>
<tr>
<td>3. ‘flesh’</td>
<td>sál</td>
<td>sal</td>
<td></td>
</tr>
<tr>
<td>4. ‘fly (n.)’</td>
<td>phálí</td>
<td>pháli</td>
<td></td>
</tr>
<tr>
<td>5. ‘feel’</td>
<td>mändída</td>
<td>mändída</td>
<td></td>
</tr>
<tr>
<td>6. ‘teach’</td>
<td>káltʃída</td>
<td>káltʃída</td>
<td></td>
</tr>
<tr>
<td>7. ‘do’</td>
<td>hódá</td>
<td>hadá</td>
<td></td>
</tr>
</tbody>
</table>

1. Provide reconstructions in the blanks above, then describe below the sound changes of the Middle Korean vowels into each of the two dialects.

---

5.2.6 Korean

The North Kyongsang dialect is spoken in the Southeast of Korea. Both it and Seoul dialect are descended from Middle Korean.

<table>
<thead>
<tr>
<th>Gloss</th>
<th>N. Kyongsang</th>
<th>Seoul</th>
</tr>
</thead>
</table>

---
1. ‘shrimp’ sebi seu
2. ‘silkworm’ nube nue
3. ‘mortar’ hobak hwak
4. ‘hairpiece’ talbi tali
5. ‘cold’ tfʰubun tfu:n
6. ‘pretty’ kobun koun

1. What one change has taken place in the development from Middle Korean to Seoul dialect in every one of these words? What is the technical term for this kind of change?

5.2.7 Japanese

These cognate sets are from the Tokyo dialect and the Shuri dialect (spoken on the island of Okinawa). Both dialects are descended from a common ancestor.

<table>
<thead>
<tr>
<th>Gloss</th>
<th>Tokyo</th>
<th>Shuri</th>
<th>Proto-language</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ‘rock’</td>
<td>ifi</td>
<td>ifi</td>
<td>_____________</td>
</tr>
<tr>
<td>2. ‘shoulder’</td>
<td>kata</td>
<td>kata</td>
<td>_____________</td>
</tr>
<tr>
<td>3. ‘hot water’</td>
<td>ju</td>
<td>ju</td>
<td>_____________</td>
</tr>
<tr>
<td>4. ‘grass’</td>
<td>kusa</td>
<td>kusa</td>
<td>_____________</td>
</tr>
<tr>
<td>5. ‘rain’</td>
<td>ame</td>
<td>ami</td>
<td>_____________</td>
</tr>
<tr>
<td>6. ‘open’</td>
<td>akete</td>
<td>akiti</td>
<td>_____________</td>
</tr>
<tr>
<td>7. ‘wine’</td>
<td>sake</td>
<td>saki</td>
<td>_____________</td>
</tr>
<tr>
<td>8. ‘hair’</td>
<td>ke</td>
<td>kii</td>
<td>_____________</td>
</tr>
<tr>
<td>9. ‘breath’</td>
<td>iki</td>
<td>iitʃi</td>
<td>_____________</td>
</tr>
<tr>
<td>10. ‘fog’</td>
<td>kiri</td>
<td>tfiri</td>
<td>_____________</td>
</tr>
<tr>
<td>11. ‘sash’</td>
<td>obi</td>
<td>ubi</td>
<td>_____________</td>
</tr>
<tr>
<td>12. ‘string’</td>
<td>o</td>
<td>uu</td>
<td>_____________</td>
</tr>
<tr>
<td>13. ‘sleeve’</td>
<td>sode</td>
<td>sudi</td>
<td>_____________</td>
</tr>
<tr>
<td>14. ‘heart’</td>
<td>kokoro</td>
<td>kukuru</td>
<td>_____________</td>
</tr>
</tbody>
</table>

1. Reconstruct the words in the parent language. For the purposes of this problem, you may ignore vowel length by treating all long vowels as if they were short.

2. Two notable sound changes have taken place in the Shuri dialect, one involving consonants and one involving vowels. These changes must have occurred in a particular order. Say what these changes are, what order they occurred in, and explain your reasoning.