Hungarian--sample homework problem and write-up

4 Hungarian

Explain what phonological process affects consonants in the following data (a vowel harmony rule makes suffix vowels back after back vowels and front after front vowels, which you do not need to account for). State what the underlying forms are for all morphemes.

<table>
<thead>
<tr>
<th>Noun</th>
<th>In N</th>
<th>From N</th>
<th>To N</th>
</tr>
</thead>
<tbody>
<tr>
<td>kalap</td>
<td>kalabban</td>
<td>kalaptoːl</td>
<td>kalapnak</td>
</tr>
<tr>
<td>kút</td>
<td>kúːdban</td>
<td>kúttoːl</td>
<td>kútːnak</td>
</tr>
<tr>
<td>zák</td>
<td>žːːgban</td>
<td>žːːktoːl</td>
<td>žːːknak</td>
</tr>
<tr>
<td>res</td>
<td>reːzben</td>
<td>reːstːol</td>
<td>reːsnak</td>
</tr>
<tr>
<td>šróːf</td>
<td>šːróːvnban</td>
<td>šːróːftːol</td>
<td>šːróːfnak</td>
</tr>
<tr>
<td>lakaːʃ</td>
<td>lakaːːzban</td>
<td>lakaːːstoːl</td>
<td>lakaːːsnak</td>
</tr>
<tr>
<td>ketret⁶</td>
<td>ketretːben</td>
<td>ketretːtːol</td>
<td>ketretːnek</td>
</tr>
<tr>
<td>test</td>
<td>tezdben</td>
<td>testːtol</td>
<td>testːnak</td>
</tr>
<tr>
<td>rab</td>
<td>rabban</td>
<td>rapstoːl</td>
<td>rabsnak</td>
</tr>
<tr>
<td>kaːd</td>
<td>kaːdban</td>
<td>kaːtːol</td>
<td>kaːdnak</td>
</tr>
<tr>
<td>meleg</td>
<td>melegben</td>
<td>melektːol</td>
<td>melegnek</td>
</tr>
<tr>
<td>víːz</td>
<td>víːzben</td>
<td>vístːol</td>
<td>víznak</td>
</tr>
<tr>
<td>varaːž</td>
<td>varaːːzban</td>
<td>varaːːstoːl</td>
<td>varaːːznak</td>
</tr>
<tr>
<td>aːɡ⁴</td>
<td>aːɡ⁴ban</td>
<td>aːkːtoːl</td>
<td>aːɡ⁴nak</td>
</tr>
<tr>
<td>sem</td>
<td>semben</td>
<td>semtːol</td>
<td>semnek</td>
</tr>
<tr>
<td>bűn</td>
<td>bűnben</td>
<td>bűntːol</td>
<td>bűnnak</td>
</tr>
<tr>
<td>torőh</td>
<td>torőːhban</td>
<td>torőːhtːol</td>
<td>torőːhnak</td>
</tr>
<tr>
<td>fal</td>
<td>falban</td>
<td>faltoːl</td>
<td>falnak</td>
</tr>
<tr>
<td>öːr</td>
<td>öːrben</td>
<td>öːrtoːl</td>
<td>öːrnak</td>
</tr>
<tr>
<td>say</td>
<td>sayaːban</td>
<td>sayaːtoːl</td>
<td>sayaːnak</td>
</tr>
</tbody>
</table>

Using the steps for alternations problems reviewed in class, provide rules and underlying representations for the data above. Your write-up should contain the following sections.

1. Morphological analysis: identify morphemes and any morpheme alternants.
2. Distribution of alternating morphemes
3. Possible analyses of alternating morphemes
4. Arguing for one analysis: which is the best of the alternative analyses?
5. Final result: URs of morphemes; P rule(s)

As the instructions with the data say, focus on the consonant alternations. (You may, but do not have to, describe the vowel alternations also.)
Hungarian voicing alternations

1 Morphological analysis: identify morphemes and any morpheme alternants.

The Hungarian words in this data consist of a root alone or a root and a suffix. The suffixes each have two alternants:

- [ben] ~ -[ban] ‘in’
- [tôːl] ~ -[tôːl] ‘from’
- [nak] ~ -[nek] ‘to’

The roots can be divided into two sets, alternating and non-alternating roots. All roots whose final consonant ends in an obstruent, whether single obstruent or cluster of two obstruents, exhibit an alternation in voicing.

‘hat’ [kalab] ~ [kalap]  
‘well’ [kuːd] ~ [kuːt]  
‘sack’ [ţaːg] ~ [ţaːk]  
‘part’ [reːz] ~ [reːs]  
‘screw’ [sroːv] ~ [sroːf]  
‘apartment’ [lakaːţ] ~ [lakaːŝ]  
‘cage’ [ketred] ~ [ketret]  
‘body’ [tezd] ~ [test]  
‘prisoner’ [rab] ~ [rap]  
‘tub’ [kaːd] ~ [kaːt]  
‘warm’ [meleg] ~ [melek]  
‘water’ [viːz] ~ [viːs]  
‘magic’ [varaːţ] ~ [varaːš]  
‘bed’ [aːɡy] ~ [aːkány]

Roots which end in a sonorant are uniformly non-alternating:

‘eye’ [sem]  
‘crime’ [bün]  
‘tower’ [toroń]  
‘wall’ [fal]  
‘guard’ [ör]  
‘mouth’ [saːy]

2 Distribution of alternating morphemes

The alternating roots divide into two sets (grouped in contiguous blocks by David Odden, the preparer of this data set).

The first set of roots, ‘hat’ through ‘body’, have final voiced obstruents only before suffixes which begin with a voiced obstruent. Elsewhere (word-finally, before a voiceless obstruent, or before a sonorant), the root ends in a voiceless obstruent:
### The next set of roots, ‘prisoner’ through ‘bed’, have final voiceless obstruents only before suffixes which begin with a voiceless obstruent. Elsewhere (word-finally, before a voiced obstruent, or before a sonorant), the root ends in a voiced obstruent:

<table>
<thead>
<tr>
<th>Root</th>
<th>{#, [-son, -vd], [+son]}</th>
<th>[-son, +vd]</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘hat’</td>
<td>[kalap]</td>
<td>[kalab]</td>
</tr>
<tr>
<td>‘well’</td>
<td>[ku:t]</td>
<td>[ku:d]</td>
</tr>
<tr>
<td>‘sack’</td>
<td>[ža:k]</td>
<td>[ža:g]</td>
</tr>
<tr>
<td>‘part’</td>
<td>[re:s]</td>
<td>[re:z]</td>
</tr>
<tr>
<td>‘screw’</td>
<td>[sro:f]</td>
<td>[sro:v]</td>
</tr>
<tr>
<td>‘apartment’</td>
<td>[laka:š]</td>
<td>[laka:ž]</td>
</tr>
<tr>
<td>‘cage’</td>
<td>[ketret’]</td>
<td>[ketred’]</td>
</tr>
<tr>
<td>‘body’</td>
<td>[test]</td>
<td>[tezd]</td>
</tr>
<tr>
<td>‘prisoner’</td>
<td>[rab]</td>
<td>[rap]</td>
</tr>
<tr>
<td>‘tub’</td>
<td>[ka:d]</td>
<td>[ka:t]</td>
</tr>
<tr>
<td>‘warm’</td>
<td>[meleg]</td>
<td>[melek]</td>
</tr>
<tr>
<td>‘water’</td>
<td>[vi:ž]</td>
<td>[vi:s]</td>
</tr>
<tr>
<td>‘magic’</td>
<td>[vara:ž]</td>
<td>[vara:š]</td>
</tr>
<tr>
<td>‘bed’</td>
<td>[a:ɡ’y]</td>
<td>[a:ɡ’y]</td>
</tr>
</tbody>
</table>

### 3 Possible analyses of alternating morphemes

The first set of roots could theoretically end in voiced or voiceless obstruents underlyingly. E.g. ‘hat’ ([kalap] ~ [kalab]) could be /kalap/ or /kalab/. If ‘hat’ is /kalap/, then [kalab] would be derived by assimilation to the voicing of the following voiced obstruent of the suffix [-[ben]]/[ban] ‘in’. If /kalab/, then [kalap] would be derived by devoicing in 3 environments: word-finally, before a sonorant, and before a voiceless obstruent.

Likewise, the second set of roots could theoretically end in voiced or voiceless obstruents underlyingly. E.g. ‘prisoner’ ([rap] ~ [rab]) could be /rap/ or /rab/. If /rab/, then [rap] would be derived by assimilation to the voicelessness of the following voiceless obstruent of the suffix -[tol]/-[töl] ‘from’. If /rap/, then [rab] would be derived by voicing word-finally, before the (voiced) sonorant of -[nak] ~ -[nek] ‘to’, and before the voiced obstruent of the suffix -[ben] ~ -[ban] ‘in’.

### 4 Arguing for one analysis: which is the best of the alternative analyses?

#### 4.1 Underlying root-final obstruent voicing contrast

The first and second sets of roots must not end in the same kinds of consonants; i.e. ‘hat’ cannot be /kalap/ and ‘prisoner’ /rap/, or ‘hat’ cannot be /kalab/ and ‘prisoner’ /rab/. That is because if ‘prisoner’ ends in /p/ and there is a voicing rule which applies word-finally to derive [b], there would be no way to prevent this voicing rule from applying to ‘hat’.
4.2 Assigning values of [voiced] to root-final obstruents in URs

Apparently, there is an underlying root-final contrast in the voicing of obstruents. But is it /kalap/ ‘hat’ vs. /rab/ ‘prisoner’, or /kalab/ ‘hat’ vs. /rap/ ‘prisoner’? If the representations are /kalap/ vs. /rab/, the rules needed are fairly simple, shown below and illustrated with derivations. (In the derivations below, “VH” = rules of vowel harmony, not given here. The capital letters in the suffixes represent vowels with no underlying value of the feature [back].)

Voicing Assimilation (a)  
[-sonorant] \(\rightarrow\) [+voiced]  
/kalap\[-sonorant\]  
/kalap-bAn/  
/kalap-tO:l/  
/kalap-nAk/  
VA (a)  
(VH)  
/kalap/  
/kalabban/  
/kalapto:l/  
/kalapnak/  

Voicing Assimilation (b)  
[-sonorant] \(\rightarrow\) [-voiced]  
/rab\[-sonorant\]  
/rab-bAn/  
/rab-tO:l/  
/rab-nAk/  
VA (b)  
(VH)  
/rab/  
/rabban/  
/rapto:l/  
/rabnak/  

The Voicing Assimilation rules apply vacuously in [kalapto:l] and [rabban].

If the contrast were characterized as /kalab/ ‘hat’ vs. /rap/ ‘prisoner’, the data could still be described, but would require a more complex rule system to derive not only the alternants before obstruent-initial suffixes, but also the alternants before sonorants and in word-final position:

Voicing Assimilation (a)’  
[-sonorant] \(\rightarrow\) [-voiced]  
[+# -sonorant]  
[+sonorant]}  
/kalab/  
/kalab-bAn/  
/kalab-tO:l/  
/kalab-nAk/  
VA (a)’  
(VH)  
/kalap/  
/kalabban/  
/kalapto:l/  
/kalapnak/
Voicing Assimilation (b)' [-sonorant] \(\rightarrow\) [+voiced] / ___ {#, [+sonorant]}. [+sonorant]}

\[
\begin{array}{llll}
/\text{rap}/ & /\text{rap-bAn}/ & /\text{rap-tO:l}/ & /\text{rap-nAk}/ \\
\text{VA (b)'} & b & b & -- & b \\
(\text{VH}) & \text{[rab]} & \text{[rabban]} & \text{[rapto:l]} & \text{[rabnak]} \\
\end{array}
\]

Clearly the rules Voicing Assimilation (a), (b) are less complex than Voicing Assimilation (a)', (b)'\(^1\). Voicing Assimilation (a), (b) derive only alternants which diverge from the UR in one environment (before obstruents).\(^2\)

5. **Final result: URs of morphemes; P rule(s)**

The UR is identical to the phonetic form of the root which occurs in unsuffixed words:

| ‘hat’  | /kalap/ |
| ‘well’ | /ku:t/  |
| ‘sack’ | /ža:k/  |
| ‘part’ | /re:s/  |
| ‘screw’ | /sro:f/ |
| ‘apartment’ | /laka:š/ |
| ‘cage’ | /ketret\(^7\)/ |
| ‘body’ | /test/  |
| ‘prisoner’ | /rab/  |
| ‘tub’ | /ka:d/  |
| ‘warm’ | /meleg/ |
| ‘water’ | /vi:z/  |
| ‘magic’ | /vara:ž/ |
| ‘bed’ | /a:g\(^7\)/ |
| ‘eye’ | /sem/  |
| ‘crime’ | /bün/  |
| ‘tower’ | /toroñ/ |
| ‘wall’ | /fal/   |
| ‘guard’ | /ör/    |

\(^1\)Although Voicing Assimilation (a)', (b)' is a fake rule, could it be collapsed into a single rule? In other words, is the following legitimate: 

[-sonorant] \(\rightarrow\) [a voiced] / ___ {#, [+sonorant], [a voiced]}. [+sonorant]}

This is in fact a legitimate formulation, since we have a pair of greek letter variables in the rule, even if the second instance of \([a]\) does not occur in each of the three contexts. The only stipulation on interpreting such rules is that the greek letter variables must be expanded first, but that is to be expected, since we do not normally expand rules containing contexts \([A,B]\) into 2 rules. With a disjunction, the claim is not that we are dealing with two or more rules, but a deep suspicion that what we are positing is not a real rule (as in the present case).

\(^2\)Moreover, the alternative analysis posits rules with no clear phonetic motivation or known cross-linguistic parallels (word-final voicing, devoicing before sonorants).
The underlying root-final voicing contrast in obstruents is preserved in word-final position and before sonorants. However, before obstruents, the contrast is neutralized in favor of the voicing of the final obstruent in the cluster.

Voicing Assimilation

\[-\text{sonorant} \rightarrow [\text{\textalpha voiced}] / \text{\textalpha voiced}\]

There are further points to note about the analysis. Voicing Assimilation iterates from right to left, applying as many times as its structural description is met in a particular word, as seen in /test-bAn/ ‘in body’ → [tezdban].

\[
\text{/test-bAn/ ‘in body’}
\]
\[
\text{VA}
\]
\[
\text{d}
\]
\[
\text{z}
\]
\[
(\text{VH}) \quad \text{[tezdban]}
\]

If iterating rules are given only one chance to apply in a derivation, the correct result only obtains with right-left iteration. A derivation with left-right iteration is shown below:

\[
\text{/test-bAn/ ‘in body’}
\]
\[
\text{VA}
\]
\[
\text{s}
\]
\[
\text{d}
\]
\[
(\text{VH}) \quad *\text{[tesdban]}
\]

Also note that Voicing Assimilation applies across morpheme boundaries or when there is no morpheme boundary present, in the conventional way. The rule is not blocked by a morpheme boundary.