Sixth International Olympiad in Theoretical, Mathematical and Applied Linguistics
Bulgaria, Sunny Beach, 4–9 August 2008
Solutions of the Problems of the Individual Contest

Problem #1. Rules:

1. The apostrophe indicates length if it follows a vowel, and is read as [ə] if it follows a consonant.
2. The letter w stands for a rounding of the lips after a consonant and for the sound [w] otherwise.
3. [ə] is pronounced, though not written, between any consonant and a following sonorant consonant (l m n).
4. [ə] is also pronounced before a consonant cluster at the beginning of a word.
5. \( p t j g gw q qw \) are pronounced as voiced consonants ([b d j g \( \gamma \) \( \gamma \) \( \gamma \)]) at the beginning of a word or between vowels and as voiceless consonants ([p t k k \( \gamma \) \( \gamma \) \( \gamma \)]) at the end of a word or next to another consonant.

Answers:

(a) 12 [ɔksa̯nɔˈɔjɔn], 13 [ɔtkɔˈɔbɔx], 14 [ɡaˈ̊mûjɔˈjɔm], 15 [emtoˈɔtɔk], 16 [dɛˈbɔlc];
(b) 17 \( tʃˈtɛˈsn \), 18 \( m\text{tes}g\text{m} \), 19 \( \text{a}l\text{a}pˈt\text{ˈg} \), 20 \( \text{gl}\text{a}m\text{ɛn} \).

Problem #2. (a) Rules:

1. Number of syllables. Each line contains 6 syllables.
2. Alliteration. See the statement of the problem.
3. Internal rhyme. Let us denote the vowels (and diphthongs) in each line by \( V_1, V_2, \ldots, V_6 \). At least one consonant immediately following \( V_5 \) must immediately follow \( V_n \) \((n = 1, 2 \text{ or } 3)\). Also, in even lines \( V_n = V_5 \).

For instance, cf. lines IV, 1–6 (alliteration is marked in boldface, internal rhyme by underlining):

IV

\[
\begin{array}{ll}
1 & \text{háði gramr, þars guðu,} \\
2 & \text{geira hregg við seggi,} \\
3 & (\text{rauð fyrði ben blöði}) \\
4 & \text{brynggí í dyn Skoglar,} \\
5 & \text{þás á raungi fyr rasi} \\
6 & (\text{róð eggliður}) \text{ seggr ...}
\end{array}
\]

(b) Leftover words: \( \text{hæegra, smiði}. \)

V

\[
\begin{array}{ll}
1 & \text{ríks} \quad (\text{preifsk reiddra ōxa} \\
2 & \text{rymr} \quad : \text{knóttu spjór i glynja} \\
3 & \text{svarsmyggð} \quad \text{bitu seggi} \\
4 & \text{sverð} \quad \text{þjóðkonungs ferðar} \\
5 & \text{þás} \quad (j \text{hugfyldra} i \text{holða}) \\
6 & \text{hlaun} \quad \text{andskoti} i \text{Gaутa} \\
7 & \text{hórg vas} \quad \text{söngr} \text{ of} i \text{svirum} \\
8 & \text{sigr} \quad (\text{flugbeiddra} m \text{vigra}).
\end{array}
\]
Problem #3. The modifier follows its head in both languages.

<table>
<thead>
<tr>
<th>(a)</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td><em>jun</em></td>
<td>bone</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>i-jun</em></td>
<td>skeleton</td>
<td>(multitude of bones)</td>
</tr>
<tr>
<td></td>
<td><em>i-wahnawa</em></td>
<td>bunch of bananas</td>
<td>(multitude of bananas)</td>
</tr>
<tr>
<td></td>
<td><em>i-drai</em></td>
<td>calendar</td>
<td>(multitude of days)</td>
</tr>
<tr>
<td></td>
<td><em>drai-hmitrötr</em></td>
<td>Sunday</td>
<td>(holy day)</td>
</tr>
<tr>
<td></td>
<td><em>gaa-hmitrötr</em></td>
<td>sanctuary</td>
<td>(holy place)</td>
</tr>
<tr>
<td></td>
<td><em>uma-hmitrötr</em></td>
<td>church</td>
<td>(holy house)</td>
</tr>
<tr>
<td></td>
<td><em>ngöne-uma</em></td>
<td>wall</td>
<td>(house border)</td>
</tr>
<tr>
<td></td>
<td><em>ngöne-gejë</em></td>
<td>coast</td>
<td>(water border)</td>
</tr>
<tr>
<td></td>
<td><em>nyine-thin</em></td>
<td>awl</td>
<td>(tool to poke)</td>
</tr>
<tr>
<td></td>
<td><em>tii</em></td>
<td>to write</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>bé-tii</em></td>
<td>pencil</td>
<td>(tool to write)</td>
</tr>
<tr>
<td></td>
<td><em>bé-wöli</em></td>
<td>fork</td>
<td>(tool to poke)</td>
</tr>
<tr>
<td></td>
<td><em>wöta</em></td>
<td>animal</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>bé-wöli-wöta</em></td>
<td>spur</td>
<td>(tool to poke animal)</td>
</tr>
<tr>
<td></td>
<td><em>bé-ôdu</em></td>
<td>cup</td>
<td>(tool to drink)</td>
</tr>
<tr>
<td></td>
<td><em>ba-jié</em></td>
<td>coast</td>
<td>(water border)</td>
</tr>
<tr>
<td></td>
<td><em>ba-bwén</em></td>
<td>twilight</td>
<td>(night border)</td>
</tr>
<tr>
<td></td>
<td><em>a-pulut</em></td>
<td>bed</td>
<td>(place to sleep)</td>
</tr>
</tbody>
</table>

(b) *wahnawa* ‘banana’, *drai* ‘day’, *wöli* ‘to poke’, *pulut* ‘to sleep’.

(c) *i-bii* ‘swarm of bees (multitude of bees)’, *tusi-hmitrötr* ‘Bible (holy book)’.

Problem #4. The noun suffixes seen in this problem are:

1. *-kasma* ‘above, overhead’, *-kotoya* ‘for’, *-pit* ‘with’;
2. *-šeh* ‘like, as if’;
3. *-ta?m* plural;
4. *-tih* ‘only (just, right)’.

After a nasal consonant (*m, n, ŋ*) the stops *p, t, k* become voiced (*b, d, g* respectively). If *k* comes after *y* the two sounds exchange places.

The possessive pronouns are *?as* ‘my’ and *mis* ‘your’; if the noun begins with a stop, this consonant becomes voiced and the corresponding nasal appears before it.

<table>
<thead>
<tr>
<th>(a)</th>
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<tbody>
<tr>
<td></td>
<td>cakyasmatih</td>
<td>right above the vine</td>
<td></td>
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<tr>
<td></td>
<td>kamajšeh</td>
<td>like a shadow</td>
<td></td>
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<td></td>
<td>?as mok</td>
<td>my corn</td>
<td></td>
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<td></td>
<td>mis ndctactam</td>
<td>your teeth</td>
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<td></td>
<td>pahsunbit</td>
<td>with the squash</td>
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<td></td>
<td>perolkotoyastehta?m</td>
<td>as if for the kettles</td>
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</table>

(b) for the chair *pokskukyotoya*  
for my kettle *?as mberolpit*  
just like a mountain *kocakšelthih*  
just like my mountain *komda?m*  
above the shadows *kamangasmata?m*  
your town *mis ngumguy*
Problem #5. The Inuktitut sentences have the following general structure:

\[
\begin{align*}
X-(q) & \quad V- & 'X V (himself).' \\
X-(q) \ Y-(r)mik & \quad V-si- & 'X V a Y.' \\
X-up \ Y-(q) & \quad V- & 'X V the Y.'
\end{align*}
\]

where \(X\) and \(Y\) are nouns and \(V\) is the verb. If a noun gets the ending \(-q\) when it is either a definite object or a subject of a sentence that doesn’t have a definite object, it also gets \(-r\) before the ending \(-mik\) when it is an indefinite object (\(nanu-q — nanu-r-mik; iluaqhaiji — iluaqhaiji-mik\)). To say ‘your’, \(-q\) is replaced by \(-it, -up\) by \(-vit\).

The verb receives the following suffixes:

- \(-j\) following a vowel or \(-t\) following a consonant;
- an ending for the persons of the subject and the definite object, if there is one:
  - in the first two schemata: \(-u-tit\ '2', \(-u-q\ '3';
  - in the third schema: \(-a-it\ '2/3', \(-a-nga\ '3/3', \(-a-atit\ '3/2'.

A transitive verb without an object is interpreted as reflexive.

(a) 13. The wolf saw your shaman.
14. Your polar bear hurt a boy.
15. Your hunter cured himself.
16. You shot the teacher.
17. You came.
18. You cured a hunter.

(b) 19. \textit{Angatkuup aanniqaatit}.
20. \textit{Ilinniaqtsiitiup inuwuhuktuq takujanga}.
21. \textit{Amaruit ukiakhqatuq}.
22. \textit{Qingmirnik qukiqsisjutit}.
23. \textit{Qingmiit ilinniaqtsiitiqsimik aanniqsijuq}.