

Ninth International Olympiad in Linguistics
Pittsburgh (United States of America), 24–31 July 2011

Individual Contest Solutions

Problem #1. The Menominee verb forms have the following structure:

			intransitive verb:																																						
<table style="width: 100%; border-collapse: collapse;"> <tr><td style="padding: 2px;">ne-</td><td style="padding: 2px;">I</td></tr> <tr><td style="padding: 2px;">ke-</td><td style="padding: 2px;">we₁₊₂</td></tr> <tr><td style="padding: 2px;">—</td><td style="padding: 2px;">he</td></tr> </table>	ne-	I	ke-	we ₁₊₂	—	he	<table style="width: 100%; border-collapse: collapse;"> <tr><td style="padding: 2px;">kaw</td><td style="padding: 2px;">down</td></tr> <tr><td style="padding: 2px;">ket</td><td style="padding: 2px;">out</td></tr> <tr><td style="padding: 2px;">kēs̄k</td><td style="padding: 2px;">through</td></tr> <tr><td style="padding: 2px;">pahk</td><td style="padding: 2px;">off</td></tr> <tr><td style="padding: 2px;">pāhk</td><td style="padding: 2px;">open</td></tr> <tr><td style="padding: 2px;">pīt</td><td style="padding: 2px;">hither</td></tr> <tr><td style="padding: 2px;">taw</td><td style="padding: 2px;">pierce</td></tr> <tr><td style="padding: 2px;">wack</td><td style="padding: 2px;">around</td></tr> <tr><td style="padding: 2px;">wāp</td><td style="padding: 2px;">begin</td></tr> </table>	kaw	down	ket	out	kēs̄k	through	pahk	off	pāhk	open	pīt	hither	taw	pierce	wack	around	wāp	begin	<table style="width: 100%; border-collapse: collapse;"> <tr><td style="padding: 2px;">-āhpe</td><td style="padding: 2px;">laughing</td></tr> <tr><td style="padding: 2px;">-ānāhkæ</td><td style="padding: 2px;">digging</td></tr> <tr><td style="padding: 2px;">-eqta</td><td style="padding: 2px;">—</td></tr> <tr><td style="padding: 2px;">-ohnæ</td><td style="padding: 2px;">walking</td></tr> </table>	-āhpe	laughing	-ānāhkæ	digging	-eqta	—	-ohnæ	walking	<table style="width: 100%; border-collapse: collapse;"> <tr><td style="padding: 2px;">-m</td><td style="padding: 2px;">I</td></tr> <tr><td style="padding: 2px;">-q</td><td style="padding: 2px;">we₁₊₂</td></tr> <tr><td style="padding: 2px;">-w</td><td style="padding: 2px;">he</td></tr> </table>	-m	I	-q	we ₁₊₂	-w	he
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If both first vowels in the word are short, the second becomes long ($e > \bar{æ}$).

- (a)
- **kekēs̄kahæq**: we₁₊₂ chop it through, break it through by tool
 - **nepāhkenan**:
 - I open, uncover it by hand ($\sqrt{\text{pāhk}}$),
 - I break it off, tear it off by hand ($\sqrt{\text{pahk}}$)
 - **wāpāhpew**: he begins laughing
- (b)
- I begin to eat it: **newāpahtan**
 - we₁₊₂ lay it flat by hand: **kekāwenæq**
 - he digs a hole: **tawānāhkæw**
 - he walks out: **ketōhnæw**

Problem #2.

- (a)
- | | |
|---------------|-----------|
| <i>bøga</i> | [bøɪva] |
| <i>knoðar</i> | [kno:ar] |
| <i>kvøða</i> | [kvø:a] |
| <i>løgur</i> | [løɪvur] |
| <i>plága</i> | [plɔava] |
| <i>skaði</i> | [skɛa:ji] |
| <i>toygur</i> | [tɔijur] |
| <i>trúgi</i> | [trɔuwi] |

- (b) In the first syllable *a* [ɛa], *á* [ɔa], *e* [e:], *ei* [ai], *ey* [ɛi], *i* [i:], *o* [o:], *oy* [ɔi], *ó* [ɔu], *u* [u:], *ú* [ɯu], *ø* [ø:].

Between vowels *ð* = *g*. The first applicable rule is applied:

1. *ð/g* [w] | [u(:)] __;
2. *ð/g* [j] | [i(:)] __ or __ [i(:)];
3. *ð/g* [v] | __ [u(:)];
4. *ð/g* [v] in a noun, [∅] in a verb.

Problem #3. Rules:

1. Adjectives follow their nouns.
2. A noun (or the adjective if there is one) gets the marker **-ě**, unless it is inalienably possessed (body part, kinship term); in the latter case it is preceded by the possessor.
3. Alienable possession is expressed by **á** between the possessor and the possessed.
4. In compound nouns the last syllable has low tone (“˘”).

- (a) **mùsúě á gbòmùě**: the woman’s fish
léŋ kúndúě á nyìmùě: the short child’s snake
gbòmù-lèndè kúndúě: the short boat
- (b) **kándò-lèndè lòdè**: the small airplane
- (c) the eagle’s snake: **kàánjàě á nyìmùě**
the small child’s eye: **léŋ lòdè já**
the tall man’s sister: **kàí jǎŋě lòd-mùsù**
the small baby-snake: **nyìmù-lèŋ lòdè**

Problem #4. In compound nouns the left-hand part modifies the right-hand one. A noun gets the ending **-tl/li** unless it has one of the suffixes **-capil** (dimin.), **-huah** ‘one who has ...’, **-tlah/lah** ‘place of many ...’, or **-tzintli** ‘revered ...’ (**-li** and **-lah** after **l**, otherwise **-tl** and **-tlah**).

- (a)
- | | |
|-----------------------------|---|
| a-cal-huah | canoe owner (a-cal-li canoe, “water house”) |
| a-chil-li | water pepper |
| a-tl | water |
| cal-lah | village |
| cal-huah | master of house |
| chil-a-tl | chili water |
| chil-li | chili |
| col-li | grandfather/ancestor |
| col-tzintli | revered grandfather/ancestor |
| cone-huah | mother, “one who has child(ren)” |
| cone-huah-capil | mum(my) |
| cone-tl | child |
| oquich-cone-tl | boy, male child |
| oquich-huah | wife, “one who has a husband” |
| oquich-totol-tzintli | revered turkey-cock |
| te-huah | possessor of stones |
| te-tlah | stony ground |
| totol-te-tl | turkey egg |
- (b) house: **calli** stone: **tetl** possessor of water: **ahuah**
revered man/husband: **oquichtzintli**
- (c) **cacahua-tl**: cocoa **cacahua-te-tl**: cocoa bean
cacahua-a-tl: cocoa drink **cacahua-huah**: possessor of cocoa

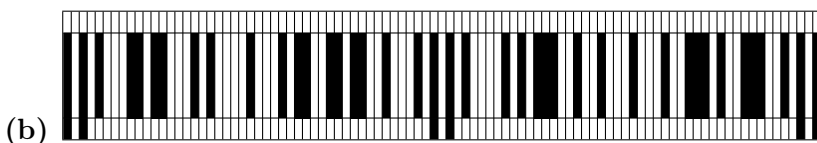
Problem #5. The patterns of bars of unit width $\bullet\bullet\bullet$ (at both ends) and $\circ\bullet\circ\circ$ (in the middle) frame two blocks of six digits. Each digit is shown as four bars of widths 1–4, with a total width of 7. There are three codes for each digit, one of which (R) is used on the right and two (A and B) on the left.

		A: $\circ\bullet\circ\bullet$	B: $\circ\bullet\circ\bullet$	R: $\bullet\circ\bullet\circ$
0	—	3211	1123	3211
1	?	2221	1222	2221
2	AABBAB	2122	2212	2122
3	AABBBA	1411	1141	1411
4	ABAABB	1132	2311	1132
5	ABBAAB	1231	1321	1231
6	ABBBAA	1114	4111	1114
7	ABABAB	1312	2131	1312
8	ABABBA	1213	3121	1213
9	ABBABA	3112	2113	3112
X	AAABBB	—	—	—

The pattern of As and Bs on the left gives the subcode. Each pattern starts with A (this indicates that the barcode is the right way up, otherwise it would start with B, the mirror image of R) and contains exactly three As. The problem features all possible patterns except AABABB (subcode 1).

Only barcodes for meat, cheese, etc., which have random weights have the price included as part of the barcode (for the rest, the price is looked up from the store’s computer system). These are produced in-store (subcode 2) and so do not have a standard layout, but in the two that are given in the problem the last four digits before the checksum are the price (pork steak: 0416 → 4 euros and 16 cents).

- (a)
1. (E);
 2. G, checksum = 2;
 3. C;
 4. D;
 5. A, Germany;
 6. I;
 7. H, cost = 4 euros and 74 cents;
 8. B, full code = 7-317442-030049;
 9. F.



- (c) This barcode is upside down (it starts with a B, not with an A), so it must be turned over and written backwards.

Norway = 70, full code = 7-022070-000035.

