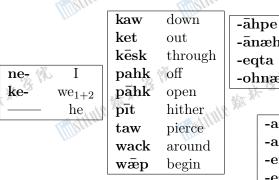# Ninth International Olympiad in Linguistics

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Individual Contest Solutions

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

ne-	I
ke-	we$_{1+2}$
——	he

kaw	down
ket	out
kēsk	through
pahk	off
pāhk	open
pīt	hither
taw	pierce
wack	around
wǣp	begin

intransitive verb:

-āhpe	laughing
-ānæhkæ	digging
-eqta	——
-ohnæ	walking

-m	I
-q	we$_{1+2}$
-w	he

transitive verb:

-ah	by tool
-aht	by mouth
-en	by hand
-es	cutting

-an	I
-æq	we$_{1+2}$
-am	he

If both first vowels in the word are short, the second becomes long (**e** > **ǣ**).

(a)
- **kekēskahæq**: we$_{1+2}$ chop it through, break it through by tool
- **nepāhkenan**:
  - I open, uncover it by hand ($\sqrt{\textbf{pāhk}}$),
  - I break it off, tear it off by hand ($\sqrt{\textbf{pahk}}$)
- **wǣpāhpew**: he begins laughing

(b)
- I begin to eat it: **newǣpahtan**
- we$_{1+2}$ lay it flat by hand: **kekāwenæq**
- he digs a hole: **tawānæhkæw**
- he walks out: **ketōhnæw**

Problem #2.

(a)

bøga	[bø:va]
knoðar	[kno:ar]
kvøða	[kvø:a]
løgur	[lø:vur]
plága	[plɔava]
skaði	[skɛaji]
toygur	[tɔijur]
trúgi	[trɐuwi]

(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** [ɐu], **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 **-ĕ**, 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) **mùsúĕ á gbòmùĕ**: the woman's fish
léŋ kúndúĕ á nyìmììĕ: the short child's snake
gbòmù-lèndè kúndúĕ: the short boat

(b) **kándɔ̀-lèndɛ̀ lɔɔ́ĕ**: the small airplane

(c) the eagle's snake: **kɔ̀ánjàĕ á nyìmììĕ**
the small child's eye: **léŋ lɔɔ́ĕ já**
the tall man's sister: **kàí jăŋĕ lɔɔ̀-mùsù**
the small baby-snake: **nyìmìì-lèŋ lɔɔ́ĕ**

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	mom(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 ●○● (at both ends) and ○●○●○ (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.

The pattern of As and Bs on the left gives the sub-code. 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).

		A: ○●○●	B: ○●○●	R: ●○●○
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	——	——	——

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.

(b)

1 453927 348790

(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.

7 022070 000035