

en(A)

Thirteenth International Olympiad in Linguistics

Blagoevgrad (Bulgaria), 20–24 July 2015

Individual Contest Solutions

Problem 1. Nahuatl:

- 1: *cē*, 2: *ōme*, 3: *ēyi*, 4: *nāhui*;
- 5: *mācuilli*, 10: *mahtlactli*, 15: *catōlli*;

- $\alpha \times 20^\beta$, $1 \leq \alpha \leq 5$, $1 \leq \beta \leq 3$:

α	
1:	<i>ceM</i>
2:	<i>ōm</i>
3:	<i>yē</i>
4:	<i>nāuh</i>
5:	<i>mācuil</i>

20^β	
20:	<i>pōhualli</i>
400:	<i>tzontli</i>
8000:	<i>xiquipilli</i>

- 7: *chicōme*;
 - $\gamma + \delta$, $\left\{ \begin{array}{l} \gamma \in \{10, 15\}, 1 \leq \delta \leq 4 \\ \gamma = \alpha \times 20^\beta, 1 \leq \delta < 20^\beta \end{array} \right\}$: γ *oM* δ ,
- $$M = \begin{cases} m & \text{before } m, p, \text{ or a vowel;} \\ n & \text{otherwise.} \end{cases}$$

Arammba:

- 1: *ngám̐bi*, 2: *yànp̐aro*, 3: *yenówe*, 4: *asàr*, 5: *tambaroy*, 6: *nimbo*;
- $\alpha \times 6$, $2 \leq \alpha \leq 5$: α *tàxwo*;
- $6^2 = 36$: *fete*, $6^3 = 216$: *tarumba*, $6^4 = 1296$: *ndamno*, $6^5 = 7776$: *weremeke*;
- $\alpha \times 6^\beta$, $2 \leq \beta$: α 6^β ;
- $\alpha \times 6^\beta + \delta$, $0 < \delta < 6^\beta$: $\alpha \times 6^\beta$ δ .

$$\begin{array}{ll}
 \begin{array}{l}
 \begin{array}{l}
 \begin{array}{l}
 10 + 1 \\
 11 \times 10 = 110
 \end{array}
 \end{array}
 \end{array}
 \end{array}
 \begin{array}{l}
 \begin{array}{l}
 5 \times 20 + 10 \\
 110
 \end{array}
 \end{array}
 \quad (1)
 \end{array}
 \begin{array}{l}
 \begin{array}{l}
 1 + 1 = 1 \times 2
 \end{array}
 \end{array}
 \quad (7)$$

$$\begin{array}{ll}
 \begin{array}{l}
 \begin{array}{l}
 1 \times 20 \\
 20 \times 2 = 40
 \end{array}
 \end{array}
 \end{array}
 \begin{array}{l}
 \begin{array}{l}
 2 \times 20 \\
 40
 \end{array}
 \end{array}
 \quad (2)
 \end{array}
 \begin{array}{l}
 \begin{array}{l}
 1 + 4 = 5
 \end{array}
 \end{array}
 \quad (8)$$

$$\begin{array}{ll}
 \begin{array}{l}
 \begin{array}{l}
 3 \times 20 + (5 + 2) \\
 67 + 14 = 81
 \end{array}
 \end{array}
 \end{array}
 \begin{array}{l}
 \begin{array}{l}
 10 + 4 \\
 81
 \end{array}
 \end{array}
 \quad (3)
 \end{array}
 \begin{array}{l}
 \begin{array}{l}
 2 \times 6 \\
 12 + 60 = 72
 \end{array}
 \end{array}
 \begin{array}{l}
 \begin{array}{l}
 36 + 4 \times 6 \\
 72
 \end{array}
 \end{array}
 \quad (9)$$

$$\begin{array}{ll}
 \begin{array}{l}
 5 + 2 = 7
 \end{array}
 \end{array}
 \quad (4)
 \end{array}
 \begin{array}{l}
 \begin{array}{l}
 3 \times 6 \\
 3 \times 18 = 54
 \end{array}
 \end{array}
 \begin{array}{l}
 \begin{array}{l}
 36 + 3 \times 6 \\
 54
 \end{array}
 \end{array}
 \quad (10)$$

$$\begin{array}{ll}
 \begin{array}{l}
 10 + 3 \\
 13 \times 3 = 39
 \end{array}
 \end{array}
 \begin{array}{l}
 \begin{array}{l}
 1 \times 20 + (15 + 4) \\
 39
 \end{array}
 \end{array}
 \quad (5)
 \end{array}
 \begin{array}{l}
 \begin{array}{l}
 6 \times 36 = 216
 \end{array}
 \end{array}
 \quad (11)$$

$$\begin{array}{ll}
 \begin{array}{l}
 5 \times 3 = 15
 \end{array}
 \end{array}
 \quad (6)
 \end{array}
 \begin{array}{l}
 \begin{array}{l}
 2 \times 6 \\
 6 + 12 = 18
 \end{array}
 \end{array}
 \begin{array}{l}
 \begin{array}{l}
 3 \times 6 \\
 18
 \end{array}
 \end{array}
 \quad (12)$$

$$\begin{array}{rcl} 3 \times 400 + 4 \times 20 + (15 + 1) & & \\ 1296 & = & 1296 \end{array} \quad (13)$$

$$\begin{array}{rcl} 1 \times 400 + 1 \times 20 + (10 + 2) & & \\ 432 & = & 432 \end{array} \quad (14)$$

$$\begin{array}{rcl} 1 \times 400 & & \\ 400 & = & 400 \end{array} \quad (15)$$

$$\begin{array}{rcl} 1 \times 8000 & & \\ 8000 & = & 8000 \end{array} \quad (16)$$

- (b) • $42 = 2 \times 20 + 2$: *öm-pöhualli-om-öme*;
• $494 = 1 \times 400 + 4 \times 20 + 10 + 4$: *cen-tzontli-on-nāuh-pöhualli-om-mahtlactli-on-nāhui*.
- (c) • $43 = 36 + 6 + 1$: *fete nimbo ngāmbi*;
• $569 = 2 \times 216 + 3 \times 36 + 4 \times 6 + 5$: *yànparo tarumba yenówe fete asàr tàxwo tambaroy*.

Problem 2. Structure of the verb form:

- I.
- **me-**: affirmative form, present, indicative mood,
 - ROOT,
 - **-pe** ‘really’, **-fe** ‘pretend to’, **-f** ‘be able to’, **-n** — infinitive.

In this part of the word:

1. $C + -C > CəC$ (*de* + *-f* + *-n* > *de-f-ə-n*, *me-* + *bəb* + *-pe* > *me-bəb-ə-pe*).
2. The last syllable receives the stress if it is closed, otherwise the penultimate is stressed (*defən* > *defən*, *mešxepe* > *mešxépe*).
3. $CéC(C)e > CăC(C)e$ (*méšxe* > *mášxe*, *mešxépe* > *mešxápe*).

- II. **-xe** — plural, **-t** — past, **-me** — conditional mood, **-qəm** — negative form.

Answers:

- (a) *zeqén* to bite
medéf (he/she) is able to sew
medáfe (he/she) is pretending to sew
səfən to be able to burn
megʷəš'əʔe (he/she) is speaking
məbáb (he/she) is flying
- (b) *çentχ'éfme* if (he/she) is able to slide
šxáfexeqəm (they) aren't pretending to eat
bəbəft (he/she) was able to fly
šxet (he/she) was eating
ʔəgʷərəgʷəpeme if (he/she) really is trembling

- (c) **mádexe** (they) are sewing
mebəbáfexe (they) are pretending to fly
sópet (he/she) really was burning
šxéfqəm (he/she) isn't able to eat
gʷəš'əʔexeme if (they) are speaking
mezáqexe (they) are biting

Problem 3.

- (a) 1. Leave the first letter in place.
 2. Delete *h* and *w*.
 3. Replace all consonant letters with digits (letters whose most common sounds are similar are grouped together):

<i>bpu</i> (<i>f</i>)	<i>cgjkqs</i> (<i>xz</i>)	<i>dt</i>	<i>l</i>	<i>mn</i>	<i>r</i>
1	2	3	4	5	6

4. Reduce any sequence of two or more identical digits to a single digit.
 5. Delete all vowels (*a*, *e*, *i*, *o*, *u*, *y*).
 6. Leave only the first three digits or add zeroes on the right to make the code one letter and three digits long.
- (b) *Allaway*: A400, *Anderson*: A536, *Ashcombe*: A251, *Buckingham*: B252, *Chapman*: C155, *Colquhoun*: C425, *Evans*: E152, *Fairwright*: F623, *Kingscott*: K523, *Lewis*: L200, *Littlejohns*: L342, *Stanmore*: S356, *Stubbs*: S312, *Tocher*: T260, *Tonks*: T520, *Whytehead*: W330.
- (c) *Ferguson*: F622, *Fitzgerald*: F326, *Hamnett*: H530, *Keefe*: K100, *Maxwell*: M240, *Razey*: R200, *Shaw*: S000, *Upfield*: U143.

Problem 4. Rules:

- Word order: V P (S/O); S/O P V Poss, V P Poss; S Poss.
- V = verb (past → future: *-bi* → *-ba*, ∅ → *-jba*).
- S = subject (noun). The subject of a transitive verb gets the ending *-ni*.
- O = object (noun).
- P = pronouns (subject + object) + tense:
 - subject:
 - * 1st *ngV-*,
 - * 2nd *nyV-*,
 - * 3rd $\left\{ \begin{array}{l} \text{intransitive verb: } gV- \\ \text{transitive verb: } \left\{ \begin{array}{l} \text{masculine } gVnV- \\ \text{feminine } ngVyV-; \end{array} \right. \end{array} \right.$
 - object: 1st *-ngV*, 2nd *-nyV*, 3rd *-∅*;

– V are vowels (past: i , ..., i , a ; future: u , ..., u).

- Poss = possessed: $\left\{ \begin{array}{l} \text{'+' : } -ngu \\ \text{'-' : } -wa \end{array} \right\} \left\{ \begin{array}{l} \text{possessor} \\ \text{masculine: } -ji \\ \text{feminine: } -nya \end{array} \right\}$

- (a)
1. *Alayulujba nguyunyu bungmanyani.* The old woman will find you (sg.).
 2. *Yagu gininya.* He left you (sg.).
 3. *Janji darrangguwaji.* The dog doesn't have a stick.
 4. *Ngirra nya alanga.* You (sg.) stole the girl.
 5. *Daguma nyinga.* You (sg.) struck me.
 6. *Dirragbi ga balamurrungunya.* She jumped with the spear.
- (b)
7. You (sg.) will leave me. *Yagujba nyungu.*
 8. The doctor slept. *Gulugbi ga ngunbulugi.*
 9. The man will run (away) with the money. *Juwa gu bardba gijilulunguji.*
 10. He will steal the dog. *Ngirrajba gunu janji.*
 11. The girl saw you (sg.). *Ngajbi ngiyinya alangani.*

Problem 5.

- (a) $\left(\begin{array}{c} \circ \circ \circ \circ \\ \omega \quad \omega \end{array} \right) \circ \left(\begin{array}{c} \circ \circ \circ \circ \\ \omega \quad \omega \end{array} \right), \left| \begin{array}{l} \circ = V (a, e, i, o, u) \\ \omega = VV (aa, ee, ii, oo, uu) \end{array} \right.$

(b)	36.	war	is—maa—ciil		daa-	rood	×	
	37.	dir mi-	yaad	wa-	daag-	taan	✓	
	38.	laba-	daad	ka	duu-	diye	✓	
	39.	ka jan-	na-daad		daa-	hiye	×	
	40.	adi-	ga i-	yo	deris-	kaa	✓	
	41.	diga-	xaar-	ka	mari-	yoo	✓	
	42.	ciid i-	yo doo-		lo di-	raac	×	
	43.	noo-	ma kee-		neen	darka	×	
	44.	ka-	la de-	yaa-	yaa mi-	yaan	×	
	45.	wu-	xuun	kaa	dan-	qaa-	baan	✓