.UKLO Round 2 March 2012.   Marking sheet

Q1 A fox among the h.

<table>
<tr><td colspan="3"></td><td>17</td></tr>
<tr><td>1.1.</td><td>a. BE</td><td>b. KIWUS</td><td>5</td></tr>
<tr><td>c. FLI</td><td>d. FLEUM</td><td>e. GEES</td><td></td></tr>
<tr><td colspan="3">1.2. Spencer's program doesn't stop applying rules when one of them succeeds – it keeps looking for applicable rules and then applies them to the output of the previous rules. This gives the right output for "walruses" and "foxes" – it removes the "s", then continues on and removes the "e" – but goes very wrong with "horses", "hens", etc.</td><td>2</td></tr>
<tr><td colspan="3">1.3. "Remove S" must come before "Remove E"; otherwise, we would get WALRUSE, FOXE, MOU, etc. instead.
"Remove S" must come before "Remove EN"; if it came after, we would get HEN instead.
"Remove S" must come before "Replace IES with Y"; if it came after, we would get GUPPY instead.
"Remove S" must come before "Replace I with US"; if it came after, we would get FUNGU instead.
"Replace I with US" must come before "Remove E"; if it came after, we would get GUPPUS instead.
"Remove E" must come before "Replace A with UM"; if it came after, we would get ALGA instead.
"Remove E" must come before "Replace ICE with OUSE"; if it came after, we would get MIC instead.

Rules do not apply twice – that is, Spencer's program probably applies each rule in the list to any relevant words exactly once and only goes through the list once. Otherwise, we would get things like CHIMPANZ or WALRU, etc.</td><td>5</td></tr>
<tr><td colspan="3">1.4. There is no one order of rules that will make Spencer's program work, for several reasons:

1. Applying "Remove S" before "Remove E" is necessary to get "walrus" and "fox" correct, but it's exactly this interaction that produces "hors" and "chimpanze."

2. No order will correctly produce "mouse." Consider the two rules (A) "Remove E" and (B) "Replace ICE with OUSE". If A comes before B, we get "mic"; if B comes before A, we get "mous" (or even "mou").</td><td>5</td></tr>
</table>

Q2. Who is good?

- Accept either 'the' or 'a' in a-d.
- Accept any order in e-h.

a	The man walks home.	3
b	Does the woman hit my father? Or: Does my father hit the woman?	3
c	Who is not a liar?	3
d	Does the teacher see the woman? Or: Does the woman see the teacher?	3
e	[hu:ʔunikat ʂu tʃipomkat]	3
f	[ʂuŋa:li to:wq hu:ʔunikat]	3
g	[ʔivi nawitmal qaj nona:ji to:wq]	5
h	[haxʂu polo:v] Or: [hax ʂu polo:v]	3

Q3. The little engine that could .... read

1	C		1
2	Every teacher can read.		2
3	G.	Upward	2
	H.	Upward	2
	I.	Downward	2
	J.	Downward	2
	K.	Upward	2
	L.	Downward	2

Q4. 100 surnames

4.1

13a.	Kĭi	15f.	Kĭue	19e.	Tsam	3
13g.	Maŭ	15g.	Ma	20b.	Fang	3
14c.	Srĭu	16g.	Yan	20c.	Giŭ	3
14e.	Xĭang	17a.	Mue	22c.	Tso	3
15b.	Ngĭŭan	18b.	Xĭa	23d.	Hŭa	3
15d.	Min	18g.	Ling	24c.	'U	3
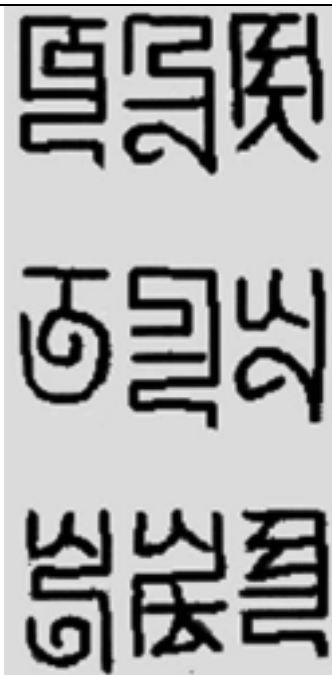
4.2		6

4.3	To begin, we can notice that, given the complexity of the glyphs and the frequent recurrence of sub-glyph shapes within them, that the glyphs likely consist of multiple sub-parts.	10
	We can then notice that the diversity of shapes at the top of the glyphs is much greater than the shapes at the bottom: there are a few dozen possible "tops" and only a handle of possible "bottoms". This, when compared to the names in the table, shows that the top shapes of glyphs represent the possible beginnings of names, of which there are many, and the bottoms represent the ends, of which there are few. This imbalance helps to confirm our earlier insight: that sub-glyphs represent sub-parts of names in some systematic manner. It also gives us a hypothesis about the overall writing direction of the text: that it might be top-tobottom overall as well.	
	At this point, there are several ways to try to fix what part of the poem these two pages represent. One way is by rhyme scheme: given that the poem is made of 8-name rhyming couplets, there should be a pattern of repeating "bottom" shapes every eight characters. Given the 8x7 shape of the pages, if the text is written horizontally (in either direction), this pattern should occur in vertical lines, and if the text is written vertically (in either direction), this patterns should occur in diagonal lines.	

It is easy to see that there are no such vertical-line patterns (especially not at the ends of lines where we would hope them to be). There is, however, an every-eight-characters diagonal rhyme pattern running through the text: from 3rd row/1st column ("3a") upward and rightward to (1c), wrapping around to 7e and then up to 1k, wrapping around again to 7m, then up to 4p.

Going by the bottom shape, the rhyme scheme of the segment pictured here looks to be something like AAAAABBBBAAAAA. There is only one place in the poem this could be: the BBBB glyphs have to represent Kŭaŭ, Laŭ, Faŭ, and Maŭ and the rest represent names ending in -ng. This result, however, is still compatible with two writing directions (upward then left-to-right, or downward then right-to-left). The former of these is unlikely given the downward writing direction within glyphs, but it is still at least possible. Looking at the "top" shapes decides it for us: we have an ABCDEFAGCHGIDJ pattern, and this only fits one way with the pattern of names beginning the text (the downward then right-to-left direction).

This is one way of determining the position and direction of the manuscript relative to the poem; other ways are equally valid and can receive equal points.

Now that we know which glyphs represent which, we can begin to determine what exactly the sub-glyph shapes represent. If you've come this far, this process will be mostly straightforward. There are four "classes" of glyphs, which I'll call A, B, C, and D:

A. initial sounds (representing word-initial b, p, dz, kh, y, tr, tsh, etc.)

B. "on-glides" (ĭ, ŭ, etc.), written after initials

C. vowels (i, u, e, etc.), written after on-glides (if any)

D. "tails"/"codas" (m, ng, ĭ, etc.), written last.

Depending on where in a word a sound occurs, a sound like [ng] or [ŭ] might have to be in a different class and thus have a different shape.

One complication to watch out for is that there is no shape for [a]. If there is no other class C (vowel) glyph in the word, that word's vowel is [a]. You can tell the difference between (say) Hŭa and Haŭ, even though [a] is not written, by the shape [ŭ] gets: the class B or class D shape.

The other complication to note is that when class B [ŭ] and [ĭ] co-occur, they are written in 'Phags-pa in an order opposite from what we would expect.

5. Catalan plurals

5.1	a. els bastaixos	b. els troleibusos	c. la clos	3
	d. els iris	e. els llaços	f. els ònixs	3
	g. les pelvis	h. els pisos	i. el sequaç	3
	j. la sequaç	k. el tastaolletes	l. les xeixs	3
	Plural. We see that the ending *s* mentioned in the statement of the problem is not added to words whose singular form already ends in s. Also, in the problem there are words with the plural ending *os*. Let us divide all words into groups according to their gender, final consonant and plural:			6

Final consonant	Plural in s (0 after s)		Plural in os	
	masculine	feminine	masculine	feminine
-s	el cactus; el pàncrees	la càries; la trencadís	el gimnàs; el permís; el vas	
-x	el apèndix; el índex	la hèlix	el flux; el suffix; el teix	
-ç		la faç (la sequaç)	el contumaç; el pedaç (el sequaç)	

We see that feminine nouns can only have the ending s (0 after s) in the plural, while masculine nouns get *os* if they are stressed on the last (or only) syllable, and s (0 after s) otherwise.

Theoretically one might derive the forms *la clo and *el tastaollete, but those are poorly compatible with the statement of the problem, which talks of nouns ending in the letters *s, x* or *ç* only. The forms *el sequaços and *la sequaçs are also wrong, because it is hinted that the words for '(male) follower' and '(female) follower' are only differentiated by their articles in the singular.

5.2	The marks ` and ′ are used when the stress falls on a non-default syllable. We can see that the mark ` is placed over *e, o, a* and the mark ′ over *i, u*. Examining the words ending in *s*, we notice that the stress marks in them are placed on the last syllable or the third one from the end. We can assume that in such words the stressed syllable is usually the penultimate, and the stress is explicitly marked when it is not. In all other words stress usually falls on the last syllable, and is marked when it does not.	6
5.3	When there is no ` or ′ mark, the stress is penultimate if the word ends in *s*, otherwise it is final.	3