(A) Reading Plains Cree (1/1)

Cree is the most widely spoken of the Canadian aboriginal languages, with about 117,000 people speaking one of its many varieties. Here are six words in Plains Cree (Nēhiyawēwin), a dialect spoken across much of the Western Canadian prairie and in parts of Minnesota, written using the Roman alphabet:

tehtapiwin	'chair'	*mistikwan*	'head'
iskwahtem	'door'	*tipahikan*	'hour'
sakahikan	'nail'	*astotin*	'hat'

Question 1.   **3 points**

Below are six related words, meaning 'bonnet', 'tack', 'little door', 'little head', 'minute', and 'little chair'. Which means which?

cipahikanis		*sakahikanis*	
miscikwanis		*ascocinis*	
cehcapiwinis		*iskwahcemis*	

Question 2.   **3 points**

Although Cree can be written in the Roman alphabet, it is more frequently written in a writing system known as 'Syllabics'. This writing system has been adopted by speakers of other Canadian aboriginal languages as well. Inuktitut Syllabics are in wide use, and speakers of Ojibwe (Anishinaabemowin), Blackfoot, and Carrier (Dakelh) have also written their languages in Syllabics.

The twelve words provided above in the Roman alphabet are written below (in random order) in Syllabics. Write their Roman alphabet equivalents in the space to the left of each word.

a. ∩<ʺΔbᑑ		g. ᐸbʺΔbσᔿ	
b. ◁ᔿᒍᒉσᔿ		h. UʺᴄΛΔ·ᑑ	
c. ᐸbʺΔbᑑ		i. ᒉᔿᒉb·σᔿ	
d. ᒉᔿ∩b·ᑑ		j. Δᔿb·ʺUᶜ	
e. ᒉ<ʺΔbσᔿ		k. ◁ᔿᑐ∩ᑑ	
f. Δᔿb·ʺᎧᒉᔿ		l. ᎧʺᒐΛΔ·σᔿ	

Notes on pronunciation: When writing Cree in the Roman alphabet, the letter <c> represents the [ts] sound.

(B) Lost in Yerevan (1/2)

On her first visit to Armenia, Millie has become lost in Yerevan, the nation's capital. She is now at the metro station named **Shengavit** but her friends are waiting for her at the station named **Barekamutyun**.

Using the plan of the Yerevan metro network, can you help Millie meet up with her friends?

(B) **Lost in Yerevan (2/2)**

Question 1.   **4 points**

Assuming Millie takes a train in the right direction, which will be the first stop after Shengavit? Put the correct letter in the box on the right. Note that all names of stations listed below appear on the map.

    a. Gortsaranayin
    b. Zoravar Andranik
    c. Charbakh
    d. Garegin Njdehi Hraparak
    e. none of the above

Question 2.   **4 points**

After boarding at Shengavit, how many stops will it take Millie to get to Barekamutyun (don't include Shengavit itself in the number of stops)?

Question 3.   **7 points**

What is the name (transcribed into Roman letters as used for English) of the end station on the short five-station line that is currently in construction, shown in a different shade on the map? (Start writing from the leftmost box.)

HINT: as readers of English you already know how irregular the correspondence between sound and written symbol can sometimes be!

The third letter has already been inserted.

		t																				

(C) **Real Money (1/2)**

Languages often have special systems for counting specific sorts of objects – and money is no exception!

Speakers of Cuzco Quechua, a widely-spoken indigenous language of Peru, used a money-counting system still based on the old colonial Spanish and Peruvian coins, the *real* and the *medio* (worth half a *real*).[1]

Peru hasn't issued a coin based on the *real* in almost 150 years. The current Peruvian currency, the *nuevo sol* (notated *S/.*), divides not into *reales* but into 100 *céntimos*.

Let's now tune into the Quechua conversations transcribed on the next page and see if you can join in!

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[1] Historical footnote: eight Spanish *reales* made up a *peso de a ocho* or *real de a ocho*, known in English as "pieces of eight" and "Spanish doubloons". These silver coins were legal tender even in the U.S., and constituted the first currency of nearly global acceptance. Remnants of this system exist all over the world, including the use of "two bits" to mean 25¢ in the U.S., and the New York Stock Exchange's custom (until 1997) of listing stock prices in 1/8th dollars.

(C) Real Money (2/2)

Question.   **9 points**

The following is a conversation between a shopkeeper *(qhatuq)* and a series of customers about the price of various tubers.[2] Knowing that the prices of potatoes, cassavas, and ocas at this market are S/.0.05, S/.0.10, and S/.0.15 each (but not knowing which costs which), fill in the missing questions and answers. (We've translated the first question as a guide.)

Q: ¿Hayk'apaqmi huh lumu, huh papa, kinsa uqa ima?

("How much for one cassava, one potato, and three ocas?")

A: Pisqaralpaqmi.

Q. ¿Hayk'apaqmi iskay papa, huh lumu ima?

A. Iskaral miyunpaqmi.

Q. ¿Hayk'apaqmi suqta papa?

A. Kinsaralpaqmi.

Q. ¿Hayk'apaqmi iskay lumu, iskay uqa, huh papa ima?

A. Pisqaral miyunpaqmi.

Q. ¿Hayk'apaqmi pisqa uqa, kinsa papa ima?

A. Suqtaral miyunpaqmi.

Q. ¿Hayk'apaqmi suqta uqa?

A. _____

Q. ¿Hayk'apaqmi iskay lumu, huh papa ima?

A. _____

Q. _____

A. Miyunpaqmi.

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[2] Potatoes were first domesticated in South America, and the Quechua people have cultivated hundreds of species (and thousands of varieties) of potatoes and other tubers such as cassava and oca.

(D) Texting, Texting, One Two Three (1/4)

The respected espionage-supply company Z Enterprises is about to release a new version of their Z1200 model wristwatch, popular among spies (and also among high-school students) for its ability to discreetly send text messages. Although the Z1200 had only four buttons in total, the user could input characters (letters, numbers, spaces, etc.) by pressing three-button sequences. For example, if we call the buttons 1, 2, 3, and 4, a was 112, A was 113, b was 114, SPACE was 111, the END sequence that finished the message was 444, etc.

The Z1300 has the same button layout, and it was planned for it to use the same text-input method. In the design stage, however, a new engineer proposes that he can significantly reduce the number of button presses needed for each message. Unfortunately, the manual had already been printed and the new Z1300 shipped without any information regarding how to use this new input method.

Being a good spy and/or high school student, though, you can figure out how it works just from a few examples, right?

Testing testing
33222143224142341122214322414234133 1

Does anyone copy
332333221431314234332422112423234234333 1

be vewy vewy qwiet im hunting wabbits
234121123422134434312342213443431234423444121221412 43123124
14222414234113443123412341412243331

Mission failed Tango not eliminated
332434143434132421244314123221233133223142341321423 2221212324124
3414231222123333 1

my boss Z is a pain in the
24334312341324343133234441414313113423141421414212223121331

uh oh no backspace on this thing
24123113223114232123413124223434334231242211324212 22314143122231
4142341331

just kiddin boss
2344324143221234341233233414212341324343331

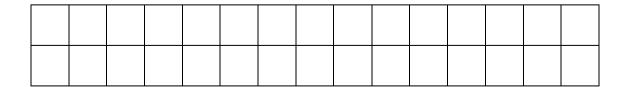# (D) Texting, Texting, One Two Three (2/4)

Preparatory decoding:

What are the input codes for each of the lowercase letters? Not every letter is used in the messages above, but you can still deduce how they are encoded. This table is just for your own use and **it will not be graded**.

a		n	
b		o	
c		p	
d		q	
e		r	
f		s	
g		t	
h		u	
i		v	
j		w	
k		x	
l		y	
m		z	

Question 1.   (5 points)

What message does the following sequence of button presses encode?
Start filling the boxes from the left end, one English letter (or space) in each box. (NOTE: Not *all* boxes need to be filled.)

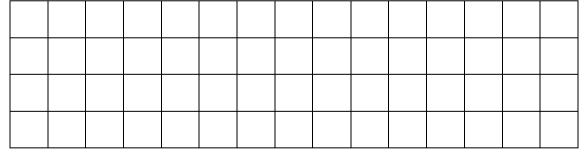**2312123222323214143131423432341322333431232414322214241423 41331**

(D) Texting, Texting, One Two Three (3/4)

Question 2.   **10 points**

With what sequences of button presses would you input the following messages?
(NOTE: Not *all* boxes need to be filled.)

help

xray

affirmative

Mayday mayday SOS

(D) Texting, Texting, One Two Three (4/4)

Question 3.　　　　　　　　　　　　　　　　　　**5 points**

This scheme only shortens the number of button presses needed on average – most messages are shorter, but there are some that will take more presses than they did on the Z1200.*

Can you find a message (using only characters whose codes you know) that will be longer using the above method than it would have been if it used exactly three button presses per character (including the END sequence)?

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* This is true for every compression scheme, actually – for any method of compressing data into less space, there will always be some example that when "compressed" is larger than it was originally!
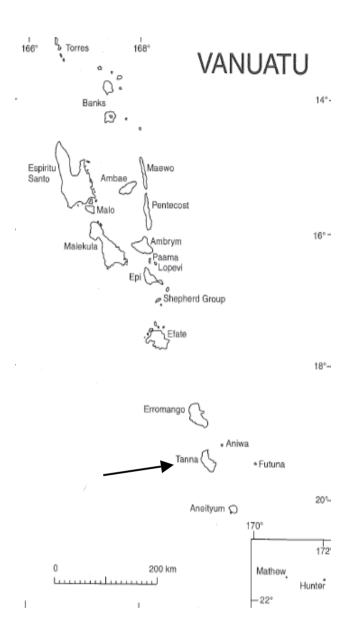
(E) Ways of belonging in Vanuatu (1/4)

Vanuatu is a South Pacific country with 74 populated islands and more than a hundred languages belonging to the Oceanic language family which is a large family of languages spoken from Papua New Guinea to Hawaii to Easter Island.

In Vanuatu, speakers of many of the languages have developed interesting ways of saying that something belongs to someone.

You are invited to examine some examples adapted from a language spoken on the island of **Tanna**, called *Enteni* in the local language. *Enteni* is also the word for 'earth'.

Take a look at the examples of how possession is expressed in this language (given on the next page) and then answer the questions that follow.

(E) Ways of belonging in Vanuatu (2/4)

	TANNA LANGUAGE	ENGLISH TRANSLATION
1	*ralah neŋow*	their canoe (belonging to several people)
2	*rahan nasumien*	his garden
3	*raham nima*	your house
4	*nepikə kahaw*	rat's tail
5	*nəməm nəkawə*	your kava (a drink) (speaking to one person)
6	*netetamlaw*	your child (speaking to mother and father of child)
7	*niŋlaw nahwel*	their laplap pudding (for both of them to eat)
8	*nenien raha Enteni*	Tanna's speech
9	*ratah naŋhatien*	our language (yours and mine - speaking to one person)
10	*narmen*	his image
11	*rahak nien*	my coconut (that I'm selling)
12	*rahak sot*	my shirt
13	*narfu tem*	man's belly
14	*neiwok mil*	my two female cousins
15	*pukah asoli*	big pig
16	*niŋək nien*	my coconut (for eating)
17	*nelkak*	my leg
18	*piam*	your same sex sibling (speaking to one person) [*sibling* is a brother or sister]
19	*nisiməteliŋəm*	your ear-wax (speaking to one person)
20	*narunien raha Tjotam*	Tjotam's knowledge
21	*niŋlah kuri*	their dog (for several of them to eat)
22	*niŋən nawanien*	his food
23	*nepikən*	his tail
24	*ratalaw jow*	their turtle (belonging to both of them)
25	*rahak jerehi*	my lobster
26	*nisin*	his excrement
27	*nentowi jow*	turtle's neck
28	*nerow raha jow*	turtle's spear
29	*nelka pukah*	pig's leg
30	*nakale naw mil*	two edges of the knife OR two knives' edges
31	*nisi kunget*	louse excrement
32	*nəmtamlaw nəkawə, ian mwamnəm*	Your kava, go and drink it! (speaking to two people)
33	*ratamlaw kuri ije?*	Where is your dog (belonging to both of you)?
34	*niŋək kuri u, ojakawan*	My dog here, I'm going to eat (it).
35	*rahak nima takaku*	My house is small.

NOTE: [ə] *represents a sound like the last sound of 'the' in 'the book'.*

[ŋ] *is like the 'ng' sound of 'hang' or the 'n' sound in 'finger'*

(E) Ways of belonging in Vanuatu (3/4)

Question 1:   **10 points**

Using the examples above as your model, translate each of these five expressions into the Tanna language.

1. rat's ear	
2. my two dogs (that I own)	
3. their bellies (speaking of several people)	
4. their brother (= of those two men)	
5. our child (= child's mother speaking to child's father)	

Question 2:   **15 points**

Now see if you can translate these five expressions into the Tanna language.

1. Tjawkelpi's house	
2. the pig's canoe	
3. My picture of you (=the one that I own that is an image of you)	
4. The house belonging to you two is big	
5. Where is my lobster (that I am going to eat)?	

(E) Ways of belonging in Vanuatu (4/4)

Question 3:   **5 points**

There are several ways of saying "their" in this Tanna language. List those found in the Tanna language examples and explain the differences in meaning they express.

'Their' in Tanna	Used when....

(F) Tangkhul Tangle (1/3)

Tangkhul is a language spoken in the northernmost district of the Indian state of Manipur. Like Manipuri (or Meithei) and many other languages of northeast India, Tangkhul is related to Tibetan and Burmese rather than to Hindi, Bengali, Marathi, Gujurati, or other well-known languages of India.

Tangkhul words can be very long and complicated. Sometimes single words may have to be translated with whole sentences in English. Also, pronouns (i.e., words like *he*, *she*, *it*, and *they*) can be left out if their meanings can be filled in from context.

See below a list of sentences from Tangkhul and their English translations (the latter are listed in *alphabetical* order, rather than corresponding to the order of the Tangkhul sentences). In the English translations, pronouns are enclosed in brackets when they are left out of the Tangkhul sentences. Tangkhul, unlike Modern English (but like Old English), distinguishes three different grammatical numbers: singular (referring to one person or thing), dual (referring to two persons or things), and plural (referring to three or more persons or things). The abbreviations sg., dl., and pl. indicate "singular," "dual" and "plural," respectively.

	Tangkhul sentences		**English translations**
a	a masikserra	1	Do they (pl.) want to pinch one another?
b	āni masikngarokei	2	Do you (sg.) see it?
c	āthum masikngarokngāilā	3	Have you (pl.) all come?
d	ini thāingarokei	4	He/she will pinch all (of them).
e	na thāilā	5	(They) all have come.
f	ithum thāingāihāirara	6	They (dl.) pinched one another.
g	rāserhāira	7	They (dl.) will come.
h	āni rāra	8	We (pl.) will have wanted to see (it).
i	nathum rāserhāiralā	9	We (dl.) saw one another.

(F) Tangkhul Tangle (2/3)

Question 1.   8 points

Match the Tangkhul sentences with their English translations by writing the number of the English translation under the letter of the corresponding Tangkhul sentence.

a	b	c	d	e	f	g	h	i

Question 2.   6 points

Translate these three sentences into English. Please follow the style of the English translations given in Question 1 as closely as possible.

nathum masikserngāira

_____

_____

āthum thāiei

_____

_____

i thāiserhāiralā

_____

_____

(F) Tangkhul Tangle (3/3)

Question 3.   6 points

Translate these three sentences into Tangkhul.

1) Do you (dl.) want to come?

_____

_____

2) You (sg.) have seen (it) all.

_____

_____

3) We (pl.) will want to see one another.

_____

_____

Problem Credits

Problem A: Patrick Littell (University of British Columbia) and Julia Workman (University of Pittsburgh)

Problem B: Dragomir R. Radev (University of Michigan)

Problem C: Patrick Littell

Problem D: Patrick Littell

Problem E: Jane Simpson (University of Sydney) and Jeremy Hammond (Max Planck Institute for Psycholinguistics). Thanks to Cindy Schneider (University of New England) for the map of Vanuatu.

Problem F: David Mortensen (University of Pittsburgh). Thanks to Tim Curnow (University of South Australia) for the map of India showing Manipur and neighbouring countries.