

<1> Get Edumacated!¹ (1/2)

(30 points)

“Homeric infixation is a morphological construction that has recently gained currency in Vernacular American English. People who are familiar with this construction invariably credit the TV animation series, *The Simpsons*, particularly the speech of the main character Homer Simpson, for popularizing this construction.” (Yu, A.C.L. 2004. Reduplication in English Homeric infixation. *NELS* 34)

Many speakers of American English, particularly younger generations, can insert the syllable “*ma*” into a word (like “edumacation” or “saxomaphone”) to produce a humorous variant. For many words, everyone agrees on how the “edumacated” variant should be formed, but there’s some disagreement, too.

Below, three people give what they feel are the correct “edumacated” versions of twelve words. We’ve capitalized the stressed syllables of the respondent’s answers. You should likewise indicate stress with capitalization in your answers.

	Alan	Barbara	Chris
Alabama	ALamaBAma	ALamaBAma	ALamaBAma
capital	CApimaTAL	CApimaTAL	CApimaTAL
captain	CApamaTAIN	CAPtamaTAIN	Uh... I'm not sure.
congratulations	conGRAtumaLAtions	conGRAtumaLAtions	conGRAtumaLAtions
hypothermia	HYpomaTHERmia	HYpomaTHERmia	HYpomaTHERmia
oboe	ObamaBOE	OboemaBOE	OOmaBOE
octagon	OCtamaGON	OCtamaGON	OCtamaGON
octet			I dunno...
purple			
tuba		TUbamaBA	
wonder	WONdamaDER	WONdermaDER	WONNNmaDER?
wonderful	WONdermaFUL	WONdermaFUL	WONdermaFUL

Task 1. We’ve left out some of their responses. Fill in the blanks with the appropriate words from the list below.

PURpamaPLE OCtemaTET TUbamaBA
 TUUUmaBA PURplemaPLE OcamaTET
 PURRRmaPLE

¹ Created by Patrick Littell.

<1> Get Edumacated! (2/2)

Task 2. How would each respondent say the following words? We’ve given you a few to get started.

	Alan	Barbara	Chris
<i>antiseptic</i>	_____	_____	_____
<i>Canada</i>	_____	_____	_____
<i>feudalism</i>	_____	<i>FEUdamaLISm</i>	_____
<i>optics</i>	_____	_____	_____
<i>party</i>	<i>PARtamaTY</i>	_____	_____
<i>table</i>	_____	_____	_____
<i>water</i>	_____	_____	<i>WAAAmATER</i>

Task 3. What do YOU feel is the correct “edumacated” version of the following words:

<i>multiplication</i>	_____
<i>anecdotal</i>	_____
<i>graduation</i>	_____
<i>hyperactivity</i>	_____
<i>Kalamazoo</i>	_____

Task 4. Respondents usually hesitate before two-syllable words, and are less sure that their answers feel “correct”. Why, and what motivates Alan’s, Barbara’s, and Chris’s eventual answers?

Solutions:

Task 1: 3.5 points: 0.5 x 7

octet	OcamaTET	OCtemaTET	I dunno...
purple	PURpamaPLE	PURplemaPLE	PURRRmaPLE
tuba	TUbamaBA	TUbamaBA	TUUUmaBA

Task 2: 19 = 1 x 19

	Alan	Barbara	Chris
antiseptic	ANtimaSEPtic	ANtimaSEPtic	ANtimaSEPtic
Canada	CAnamaDA	CAnamaDA	CAnamaDA
feudalism	FEUdamaLISm	FEUdamaLISm	FEUdamaLISm
optics	OPamaTICS	OPtimaTICS	OPPmaTICS/OOPPmaTICS
party	PARtamaTY	PARtymaTY	PAARRmaTY or PARRRmaTY
table	TAbamaBLE	TAblemaBLE	TAAmaBLE
water	WAtamaTER	WAtermaTER	WAAAmATER

N.B. Some degree of variance from these answers is expected and permitted, especially regarding syllabification, stress, expressing length for Chris, etc. The important part is that Alan always tries to insert <a> and will fall back to a partial reduplicant <Ca> when necessary, Barbara reduplicates CV/CR/CL, and Chris lengthens.

Alan putting in an additional consonant before -ama- is a minor mistake, to be graded as a minor deduction or no deduction at all. Same with Barbara reduplicating a fuller syllable like TIC or TICS instead of just TI in "optics".

Task 3. What do YOU feel is the "edumacated" version of the following words:

multiplication _____

anecdotal _____

graduation _____

hyperactivity _____

Kalamazoo _____

2.5 = 5 x 0.5 Any reasonable answer is given 100% points here, since it's a judgment call. This is more to get them thinking about the next question.

Task 4. Respondents usually hesitate before two-syllable words, and are less sure that their answers feel “correct”. Why, and what motivates Alan’s, Barbara’s, and Chris’s eventual answers?

5 points

Various kinds of answers would be acceptable here; what we’re looking for is nontrivial insight into what might be going on rather than an answer according to what a phonologist might answer.

Nonetheless, a top-quality answer should probably bring up the idea that the respondents are trying to achieve contradictory goals, and that different respondents’ strategies here are prioritizing different goals. (Other top quality answers are possible, but I can’t anticipate what they might be.)

Points are available for observing that (a) there’s something contradictory/impossible/problematic about asking this for two-syllable words, (b) suggesting why this might be, (c) observing that the speakers are systematic in how they solve this, (d) describing what each speaker does, and (e) making an attempt at explaining why speakers strategies are differing.

<2> How's your Hittite?² (1/2)

(15 points)

Hittite is an extinct language that belongs to the Anatolian branch of the Indo-European language family. It was spoken in the ancient Hittite Empire in second millennium BCE. Hittite was written using cuneiform script.



	Ca	Ce	Cf	Cu	ac	ec	ic
k	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗
g	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗
q	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗
p	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗
b	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗
t	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗
d	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗
n	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗
z	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗
s	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗
h	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗
i	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗
w	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗	𐎗

The excerpt below is a (simplified) phonetic transliteration of a cuneiform passage found on a tablet. The simple capitalized words denote so called Sumerograms – signs that were written using Sumerian cuneiform, and the capitalized words in italics denote Akkadograms – signs that were written using Akkadian cuneiform.

Našta illuyankan
 ḥantešnaš šarā kallišta
 kāšawa EZENan iyami
 nuwa adanna akuwanna eḫu

našta illuyankaš *QADU* [DUMUMESŠ-ŠU]
 šarā úēr nuza eter ekuer
 našta palḥan ḥūmandan ekuer
 neza ninkēr

ne namma ḥattešnaš kattanta
 nūmān pānzi ḥupašiyašša úit
 nu illuyankan išḫimanta kalēliēt

IM-aš úit nukán illuyankan
 kuenta DINGIRMEŠ-ša kattišši ešer

Here is its translation into English:

And he called up the snake from the hole: “Behold the feast I’m making! Come to eat and drink!” And the snake came up with his sons. And they ate and drank. And they could no longer go down into the hole again. And Hupasiyas came and tied the snake with a rope. The Stormgod came and killed the snake; and the gods were with him.”

Task 1: Match the following Hittite word forms with their English translations by writing the appropriate letter (a...g) to the right of the Hittite word in the table below.

A.	eter	
B.	ḥanteššar	
C.	úit	
D.	illuyankaš	
E.	našta	
F.	šarā	
G.	ekuer	

a.	snake
b.	hole
c.	came
d.	and
e.	up
f.	drank
g.	ate

² Created by Dorottya Demszky.

<2> How's your Hittite? (2/2)

Task 2: Match the following suffixes (A to G) with their grammatical roles (a to g). Answer by placing the appropriate letter (a-g) to the right of the suffix:

A.	-aš	
B.	-ša	
C.	MEŠ	
D.	-er/ēr	
E.	-an	
F.	-anna	
G.	-it	

- a. marker of the infinitive (e.g., in English: *to* sleep, *to* walk)
- b. plural marker (e.g., in English: apples)
- c. marker of 3rd person plural, past tense (e.g. in English: *they* walked)
- d. marker of the direct object (in English only personal pronouns have distinct 'object' forms which contrast with their 'subject' form: e.g., 'she hit *him*' and not 'she hit *he*')
- e. marker of the subject (in English the subject is unmarked, but it is the entity performing the action: e.g., in '*The dog* chased the cat', 'the dog' is the subject while 'the cat' is the object.)
- f. marker for 3rd person singular, past tense (e.g., in English: *he* walked)
- g. a marker denoting 'and'.

Task 3: As you may have noticed, ends of lines do not always coincide with the ends of clauses or sentences. What is the part of speech of the word that a Hittite clause (or sentence) ends with? Select from the following choices by placing a tick (✓) beside your choice.

adjective	<input type="checkbox"/>
adverb	<input type="checkbox"/>
noun	<input type="checkbox"/>
preposition	<input type="checkbox"/>
verb	<input type="checkbox"/>

Solutions:

Task 1: Match the following Hittite word forms with their English translations by writing the appropriate letter (a...g) to the right of the Hittite word in the table below.

7 points: 1 x 7

A.	eter	g
B.	ḫanteššar	b
C.	úit	c
D.	illuyankaš	a
E.	našta	d
F.	šarā	e
G.	ekuer	f

a.	snake
b.	hole
c.	came
d.	and
e.	up
f.	drank
g.	ate

Task 2: Match the following suffixes (A to G) with their grammatical roles (a to g). Answer by placing the appropriate letter (a-g) to the right of the suffix:

7 points: 1 x 7

A.	-aš	e
B.	-ša	g
C.	MEŠ	b
D.	-er/ēr	c
E.	-an	d
F.	-anna	a
G.	-it	f

Task 3: As you may have noticed, ends of lines do not always coincide with the ends of clauses or sentences. What is the part of speech of the word that a Hittite clause (or sentence) ends with? Select from the following choices by placing a tick (✓) beside your choice.

1 point

adjective	<input type="checkbox"/>
adverb	<input type="checkbox"/>
noun	<input type="checkbox"/>
preposition	<input type="checkbox"/>
verb	<input checked="" type="checkbox"/>

<3> FAN FICTION³ (1/2)

(18 points)

MARY SU.0 is a fan-fiction writing robot. Unfortunately, she's not very good at what she does. MARY writes fan-fiction by reading in the text of a book (or series of books) and randomly generating new sentences based on the text. Her latest effort is fan-fiction based on the Harry Potter book series.

MARY SU.0 has a few different methods that she's able to use for generating sentences. The first class of methods are called *ngram* methods. The simplest of these methods is the *unigram* method. In the unigram method, MARY chooses each token of the sentence completely randomly from the entire vocabulary of the book she read. (A token can also be a punctuation mark.) An example of a sentence generated using this method might look like this:

gave spiral the truly poisoned , Neville the shoulder Invisibility

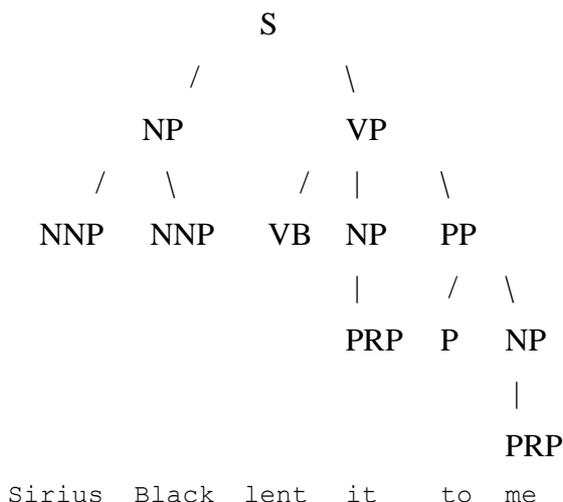
A second method is the *bigram* method. In this method, MARY first finds all the tokens that were used to start a sentence in the text and randomly chooses one of these to start the sentence. Then she builds the rest of the sentence by looking at the most recent token generated, finding all tokens that occur immediately after that token in the text, and randomly choosing one of these. For example, if the most recently generated token was "red", MARY would find all the tokens in the text that immediately follow red, {"hair", "curtains", "as" ...} and randomly choose one of these to be the next word. A sentence generated using the bigram method might look like this:

Face your nose noisily after you saying stuff .

A third method is called the *trigram* method. This method is very similar to the bigram method, but uses the previous two tokens (instead of the previous one) to decide what the next token will be. A sentence generated using the trigram method might look like this:

But Harry hardly noticed that six extra chairs . "

The last method that MARY can use to generate sentences is called the *Context Free* method. This method starts by taking each sentence in the text and generating a grammar tree, like the one below, for it.



³ Created by Ben King.

<3> FAN FICTION (2/2)

To generate a new sentence, she first generates an "S" which represents a sentence. Then she looks through her collection of grammar trees for all the sets of symbols ([NP VP .] for example) that occur immediately under an "S". She then repeats this process recursively for each of the new items generated until the tree has no more nodes that can be expanded (once a token is generated, it cannot be expanded). A sentence generated by this method might look like this:

The next question will cast by Ron .

Task: Below is a collection of sentences. Two of them are real sentences from the Harry Potter series. The rest were generated using one of the methods above. Next to each sentence, write either "U" (for unigram), "B" (for bigram), "T" (for trigram), or "CF" (for context free) to indicate the method that most likely generated that sentence, or if you think the sentence was not automatically generated, write "R" (for real).

	Headmaster uninjured could that was Malfoy that badges		"Sorry!" he said," said Mr. Malfoy's eyes.
	He bent over top of the water blushing furiously.		Harry wasn't," said Dumbledore went slightly surprised .
	There were crouching in your bedroom.		years beginning at to annoyance spider!" just months Harry
	He lived about a hundred wizards were closing.		You might have been an impostor.
	Ron spooned iron bolts, keyholes, and a heavy wooden breadboard onto her back and picked up a fistful.		They'll be the first to rise up in the Invisibility Cloak on," said Professor Flitwick pressed a box into his bag.
	"What?" said Harry.		The broom gave them an enormous wink.

Solutions: 18 points = 1.5 x 12

CFG sentences

he bent over top of the water blushing furiously .
 the next question will cast by ron .
 the broom gave them an enormous wink .
 the room went to his lap though .
 ron spooned iron bolts, keyholes, and a heavy wooden breadboard onto her back and picked up a fistful .
 " exactly , " said harry , picking up the oracle and harry .

Trigram sentences

But Harry hardly noticed that six extra chairs . "
 They ' ll be the first to rise up in the Invisibility Cloak on , " said Professor Flitwick pressed a box into his bag .
 The door opened and a few simple spells ?
 He lived about a hundred wizards were closing .
 " Sorry ! " he said , " said Mr. Malfoy ' s eyes .

Bigram sentences

Harry was n ' t , " said Dumbledore went slightly surprised .
 There were crouching in your bedroom .
 In the chocolate and because he crouched behind you .
 Face your nose noisily after you saying stuff .

Unigram sentences

were , similar engine the each Ginny
 gave spiral the truly poisoned , Neville the shoulder Invisibility
 Headmaster uninjured could that was Malfoy that badges
 years beginning at to annoyance spider ! " just months Harry

U	Headmaster uninjured could that was Malfoy that badges	T	"Sorry!" he said , " said Mr Malfoy's eyes .
CF	He bent over top of the water blushing furiously .	B	Harry wasn't," said Dumbledore went slightly surprised .
B	There were crouching in your bedroom.	U	years beginning at to annoyance spider!" just months Harry
T	He lived about a hundred wizards were closing.	R	You might have been an impostor .
CF	Ron spooned iron bolts, keyholes, and a heavy wooden breadboard onto her back and picked up a fistful.	T	They'll be the first to rise up in the Invisibility Cloak on," said Professor Flitwick pressed a box into his bag .
R	"What?" said Harry.	CF	The broom gave them an enormous wink.

<4> Best to deny it all in Warlpiri⁴ (1/1)

(30 points)

Warlpiri is the first language of over 2,000 people who live in communities on or near their traditional lands in the Tanami Desert area of the Northern Territory of Australia. Since 1973 children in these communities have been educated in both Warlpiri and English, so that many Warlpiri people both speak and write their language. National and local news is broadcast in Warlpiri on the national ABC (Australian Broadcasting Commission) network.

Study these Warlpiri sentences and their English translations:

	Warlpiri	English
1.	Nganangkungku pakarnu?	<i>Who hit you?</i>
2.	Kulaju nganangu pakarnu.	<i>Nobody hit me.</i>
3.	Ngananpa nyangu?	<i>Who did you see?</i>
4.	Kularna ngana nyangu.	<i>I didn't see anyone.</i>
5.	Ngana wantija watiyangurlu?	<i>Who fell from the tree?</i>
6.	Nganamayi wantija.	<i>I don't know who fell.</i>
7.	Kula ngana wantija.	<i>No one fell.</i>
8.	Nyiyarlunpaju pakarnu?	<i>What did you hit me with?</i>
9.	Kularnangu nyiyarlu pakarnu.	<i>I didn't hit you with anything.</i>
10.	Kularna ngana pakarnu.	<i>I didn't hit anyone.</i>

Using the knowledge of Warlpiri gained from studying the sentences above and those below, fill in the missing translations in the appropriate language.

	Warlpiri	English
11.	Nyarrparakurra yanu?	<i>Where did he go to?</i>
12.	Nyarrparakurramayi yanu.	
13.		<i>He didn't go anywhere.</i>
14.		<i>Who hit me?</i>
15.	Nganangkumayingki pakarnu.	
16.	Nyarrpararlanpa nyangu?	<i>Where did you see him?</i>
17.	Kularna nyarrpararla nyangu.	
18.	Nyiyarpa nyangu?	
19.		<i>I didn't see anything.</i>
20.	Nyarrparangurlunpa yanu?	
21.		<i>I didn't go from anywhere.</i>
22.		<i>I don't know what you hit me with.</i>

⁴ Created by Mary Laughren.

Solutions (in red):

	Warlpiri		English
11.	Nyarrparakurra yanu?		Where did he go to?
12.	Nyarrparakurramayi yanu.	1.5	<u>I don't know where he went (to).</u>
13.	<u>Kula nyarrpara-kurra yanu.</u>	4	He didn't go anywhere.
14.	<u>Ngana-ngku-ju pakarnu?</u>	4	Who hit me?
15.	Nganangkumayingki pakarnu.	2	<u>I don't know who hit you.</u>
16.	Nyarrpararlanpa nyangu?		Where did you see him?
17.	Kularna nyarrpararla nyangu.	1.5	<u>I didn't see him anywhere.</u>
18.	Nyiyarpa nyangu?	1.5	<u>What did you see?</u>
19.	<u>Kula-rna nyiya nyangu.</u>	4	I didn't see anything.
20.	Nyarrparangurlunpa yanu?	1.5	<u>Where did you go from?/ From where did you go / you went from where?</u>
21.	<u>Kula-rna nyarrpara-ngurlu yanu.</u>	5	I didn't go from anywhere.
22.	<u>Nyiyarlu-mayi-ji pakarnu.</u>	5	I don't know what he hit me with.
		30	

12. Need to get [I don't know] [where (to)] [he went] (0.5 for each of these)

15. Need to get [I don't know" [who] [hit] [you] (0.5 for each of these)

17. Need to get [I] [didn't see] [anywhere] (0.5 for each of these)

18. Need to get [What] [did...see] [you] (0.5 for each of these)

20. Need to get [Where ...from/ from where] [did...see] [you] (0.5 for each of these)

13/14/19/21/22 1 pt for each of the morphemes separated by hyphens or by spaces in answers (morphemes within a word NOT separated in students answers of course)

Take 0.5 off for incorrect word order per Warlpiri answer

Comments:

This problem has a number of difficulties:

1. Interpretation of quantifiers depending on their position in a clause, whether in scope of negation (marked by clause-initial *kula*) or in scope of enclitic *mayi*, or outside the scope of either in interrogative function.

2. Placement of pronominal enclitics (following first phrase of clause) and their form, including operation of vowel harmony, e.g. in 22. first sg object is *ji* and not *ju* as in 2; by analogy with 2nd sg object *ngku* in 1 and *ngki* in 15.

3. Case-marking: ergative case on subject of transitive verb (2 allomorphs -ngku vs -rlu) and absence of case-marking on intransitive subject or transitive object.
4. Postpositions vs prepositions as in English, and the inability of quantifier to move away from governing postposition: cf. **Who** did you go **with**? vs **Who-with** you go.
5. Although alternative word order is possible in most of the Warlpiri sentences, given the word order model given, answers that vary from that would be marked incorrect (even if not incorrect in *real* Warlpiri).

<5> Don't Sell The House!⁵ (1/1)

(35 points)

This problem involves the Nung language of northeastern Vietnam, spoken by about a million people and related to the Thai, Lao, Isan, Shan, and Zhuang languages of Southeast Asia in the Tai-Kadai family. It is not related to Chinese, Vietnamese, Khmer, Hmong, Malay, or Burmese, so far as we know. In this problem, the Nùng Phạn Slinh variety of Nung will be used. In Nùng Phạn Slinh as seen here, word order is fixed: that is, for every sentence containing certain words, *there is only one way to properly order those words*.

Task: Here is a list of sentences in Nung and their English translations. Find the sentences without English or Nung equivalents and write down the missing translation.

Note: The marks above vowels indicate tone and the length of the vowel. ɗ and sɿ are consonants. You do not need to know how to pronounce Nung in order to solve the problem.

1.	Cáu ca vữhn nahng kíhn.	I was about to continue to eat it.
2.	Cáu cháhn slòng páy mi?	Do I truly want to go?
3.	Cáu mi slày kíhn.	I don't have to eat it.
4.	Cáu ngám hẻt pehn tế.	I did it like that just now.
5.	Cáu tan đohc háhn mưhng.	I only saw you.
6.	Cáu vữhn nahng bô sạhm tẳhng hẻt hơn.	I also continue to build the house alone.
7.	Da kíhn!	Don't eat it!
8.	Da khá hơn!	Don't sell the house!
9.	Mưhn chóng ca cháhn fải khá.	Then she truly was about to have to sell it.
10.	Mưhn mi cháhn đày non.	She truly can't sleep.
11.	Mưhn náhc-thày chóng bô sạhm kíhn.	Then she also just previously ate it.
12.	Mưhng náhc-thày slòng tẳhng páy.	You wanted to go alone just previously.
13.	Cáu cháhn đày non.	
14.	Da páy non!	
15.	Mưhn bô sạhm mi slòng hẻt hơn mi?	
16.	Mưhn ngám bô sạhm páy hơn.	
17.		I wasn't about to eat it just previously.
18.		She didn't have to eat it alone like that just now.
19.		The house truly can't eat you.
20.		Then were you also about to go just previously?

⁵ Created by Alex Wade.

Solution:

13.	Cáu cháhñ ðày non.	I can truly sleep. (1)
14.	Da páy non!	Don't go (to/and) sleep! (2)
15.	Muññ bô sạhñ mi slòng hẻht hơn mi?	Is she also unwilling to build the house? (2)
16.	Muññ ngám bô sạhñ páy hơn.	She also went home just now. (2)
17.	Cáu náhc-thày ca mi kíhn. (5)	I wasn't about to eat it just previously.
18.	Muññ ngám mi slày táhng kíhn pehn tẻ. (8)	She didn't have to eat it alone like that just now.
19.	Hơn mi cháhñ ðày kíhn muñng. (6)	The house truly can't eat you.
20.	Muñng náhc-thày chớng ca bô sạhñ páy mi? (8)	Then were you also about to go just previously?

Scoring:

- One point for each correct Nung word. (Maximums per sentence are shown, so max = 27.)
 - In Nung, the order of words is crucial so a word is wrong if it is in the wrong position.
 - So:
 - B A where A B is correct: only one word is correct
 - A Z where A B ...Z is correct: both words are correct
 - accept correct words so as to maximize the score.
 - But accept Nung misspellings.
 - Treat a compound (e.g. náhc-thày) as a single word.
- Two points for each correct English sentence. (Max = 8)
 - One point with one wrong word-meaning.
 - Accept English alternatives that convey roughly the same meaning, especially if they include the same words but in a different order. (E.g. 'build a house' is expressed literally in Nung as 'do a house', so this could be accepted.)
 - Ignore minor misspellings or tense changes.

Comment

This is a problem about syntax, and specifically about the order of words in a clause. As explained in the introduction, Nung word order is fixed, meaning that for a given sentence with a given meaning there is only one correct way to order the words.

- The word-order rules distinguish the following elements also found in English:
 - the subject (e.g. We really like them.)
 - the main verb (e.g. We really like them.)
 - the object (e.g. We really like them.)
 - an adverb (e.g. We really like them.)
- There is also a question-marker *mi*.
- The only permitted order of these elements is this:
 - subject – adverb – verb – object – question-marker
- But there can be many adverbs, whose order is also fixed (see below).
- Objects:
 - 'it' as an object is left unsaid but implied.
 - 'Like that' is treated as an object in terms of word order.

Explanation:

In Nung, word order is fixed, meaning that for a given sentence, there is only one correct way to order the words. We can figure out from comparing sentences with the same subject, same adverb, same main verb, or same object that in Nung, sentences are constructed in subject-adverb-verb-object-question_marker order, where there can be many adverbs and ‘it’ as an object is left unsaid but implied. ‘Like that’ is treated as an object in terms of word order.

The correct order of adverbs is:

náhc-thày	ngám	chǒng	ca	vǔhnh nhahng	bô sahm	mi	cháhn	slòng / slày / fải / ðày	tǎhng
just previously	just now	then	about to	continue to	also	not	truly	want / [don't] have to / have to / can	alone

In addition, we know that *da* ‘don’t’ and *tan ðohc* ‘only’ both occur before the verb, but in our data, no other adverbs occur in the same sentence as *da* or *tan ðohc*, so it is unclear what the correct order should be.

The main question and challenge of the problem consists of identifying the correct positioning of adverbs, which always occur in a fixed order. A strategy for discovering this is to list all the orderings attested, and merge those to create a comprehensive order for all the adverbs provided. Crucially, it is necessary to also consider the Nung sentences provided without translations in order to clarify where in the pattern the adverb *ngám* lies.

The secondary challenge of the problem is to map Nung sentences onto English ones: not only the word order but also the meaning may differ slightly. For example, in Nung ‘build a house’ is expressed as ‘do house’. For the purposes of this problem, small differences in translation that represent equally valid interpretations of a Nung or English sentence are allowed as long as they follow proper Nung or English word order.

List of words not previously defined:

cáu	I	khǎi	sell	mưhng	you
hǎhn	see	kíhn	eat	non	sleep
hěht	do, build	mi	question-marker	páy	go
hơn	house, home	mưhn	she	pehn té	like that

<6> Tunnelling back through Tocharian prehistory (1/2) (22 points)

The Tocharian languages were an extinct branch of the Indo-European language family (including English, French, German, Greek, and many others in Europe). Linguists have reconstructed the ancestor language, called Proto-Indo-European, from which all the daughter branches descended.

A major part of language change is sound change, where a language's phonemes shift around over time. Sound change is importantly regular, and can be encapsulated neatly by writing down rules to describe how one stage of the language proceeds to the next. For example, a rule like:

$$t > d / _r$$

means that all instances of 't' change to 'd' before 'r', so *tree* would become *dree*, while:

$$p > \emptyset / _ \#$$

means that all instances of 'p' disappear (change to 'zero' represented by 'ø') at the end of a word (represented as the hash #), so *stop* would become *sto*.⁶ Sound changes apply to all sounds, in all words, that fit their criteria (the stipulation after '/' in the rules).

Because many ancient languages were never written down until recent millenia, linguists have to rely on clever deductions to work out the details of their early history. Our only records of Tocharian are some 9th century manuscripts around the Tarim Basin in western China, so our knowledge of its development comes from inferences of this type.

Here are some Tocharian words with their English equivalents. These groups of words represent seven stages in the very early history of the language, in a random order:

<i>share</i>	<i>row of teeth</i>	<i>knee</i>	<i>war</i>	<i>hundred</i>	<i>dog</i>	<i>prop</i>
pákos	kómos	kónu	kóro-	kṃtóm	kuó	stema-
págos	gómos	gónu	kóro-	kṃtóm	kuó	stema-
b ^h ágos	jómb ^h os	jónu	kóro-	kṃtóm	kuó	stemb ^h a-
b ^h ágos	jómb ^h os	jónu	kóro-	cṃtóm	cuó	stemb ^h a-
páko	kómo	kónu	kóro-	kṃtóm	kuó	stema-
b ^h ágos	gómos	gónu	kóro-	kṃtóm	kuó	stema-
b ^h ágos	gómb ^h os	gónu	kóro-	kṃtóm	kuó	stemb ^h a-

Note: The dot under the first 'm' in the word for 'hundred' signals a breathy unvoiced nasal sound. Not relevant for solving this puzzle.

As we can see, between these stages of Tocharian, some sound changes have occurred.

⁶ Hash (#) can also mark the beginning of a word.

Solutions:

	<i>share</i>	<i>row of teeth</i>	<i>knee</i>	<i>war</i>	<i>hundred</i>	<i>dog</i>	<i>prop</i>	<i>Sound Change</i>
1	b ^h ágos	jómb ^h os	jónu	kóro-	cṁtóm	cuó	stemb ^h a-	c > k
2	b ^h ágos	jómb ^h os	jónu	kóro-	kṁtóm	kuó	stemb ^h a-	j > g
3	b ^h ágos	gomb ^h os	gónu	kóro-	kṁtóm	kuó	stemb ^h a-	b ^h > ø / m_
4	b ^h ágos	gómos	gónu	kóro-	kṁtóm	kuó	stema	b ^h > p / #_
5	págos	gómos	gónu	kóro-	kṁtóm	kuó	stema	g > k
6	pákos	kómos	kónu	kóro-	kṁtóm	kuó	stema	s > ø / _ #
7	páko	kómo	kónu	kóro-	kṁtóm	kuó	stema	

Students might put the sound changes in the cell below where I have put them.

2 points for each correct sound change: 2 x 6 = 12 Accept either ø or 0 for deletion (zero).

6 points if all rules in correct order, otherwise they don't get full marks - take 1 point off for any rule that is out of correct order. 1 x 6

4 points if all words in 7 lists are in correct order (ignore acute accent and other diacritics): take 0.5 off for a list that has word forms in wrong order relative to rules.

TOTAL: 22