

(H) Counting in Irish (1/4)

H1.

- a. naoi mbád déag is ceithre fichid

9	9		b	o	a	t	s							
---	---	--	---	---	---	---	---	--	--	--	--	--	--	--
- b. sé dhuine déag

1	6		p	e	o	p	l	e						
---	---	--	---	---	---	---	---	---	--	--	--	--	--	--
- c. naoi nduine

9		p	e	o	p	l	e							
---	--	---	---	---	---	---	---	--	--	--	--	--	--	--
- d. fiche gasúr

2	0		b	o	y	s								
---	---	--	---	---	---	---	--	--	--	--	--	--	--	--
- e. garra déag is fiche

3	1		g	a	r	d	e	n	s					
---	---	--	---	---	---	---	---	---	---	--	--	--	--	--

H2.

- a. 2 boys

d	h	á		g	h	a	s	ú	r											
- b. 38 walls

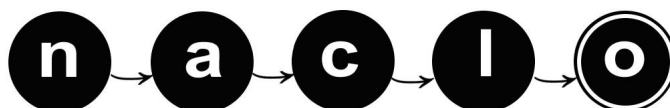
o	c	h	t		m	b	a	l	l	a		d	é	a	g		i	s		
	f	i	c	h	e															
- c. 14 walls

c	e	i	t	h	r	e		b	h	a	l	l	a		d	é	a	g		
- d. 71 doors

d	o	r	a	s		d	é	a	g		i	s		t	r	í				
f	i	c	h	i	d															
- e. 21 boats

b	á	d		i	s		f	i	c	h	e										
- f. 90 people

d	e	i	c	h		n	d	u	i	n	e		i	s							
c	e	i	t	h	r	e		f	i	c	h	i	d								



(H) Counting in Irish (2/4)

H3.

Any enumerated noun phrase (ENP) in Irish has four positions, only one of which—the Head—must be filled. These four positions are:

- 1) Pre-Head
- 2) Head
- 3) Post-Head
- 4) Twenties.

The Pre-Head position contains either nothing, a numeral from two through ten, or a certain number of twenties (*fichid*). If there is one item, or a factor of ten plus one (e.g., 11, 21, 31, 41, 51, etc.) nothing appears in the Pre-Head position. If there are 2-10 items, or a factor of ten plus 2-9, the number 2-10 appears in the Pre-Head position (e.g. *dha* "2", *trí* "3", *ceithre* "4", *cúig* "5", *sé* "6", *seacht* "7", *ocht* "8", *naoi* "9", *deich* "10"). If there are 20 items, or a factor of 20 items (e.g., 20, 40, 60, etc.), the number of twenties appears in the Pre-Head position (e.g. *fiche* "20", *dha fichid* "two twenties", *tri fichid* "3 twenties", etc.).

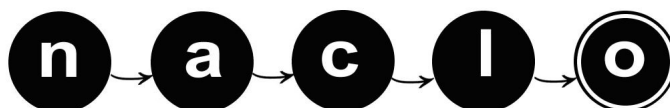
The Head position contains the enumerated noun in the singular or appropriate plural form (see below).

The Post-Head position contains either nothing, the numeral *amháin* "one", or the Post-Head form of the numeral "ten", *déag*. If there is only one item, the Post-Head position contains only the numeral *amháin* "one", and there is nothing else in the ENP. If the number of items is 11-19, 31-39, 51-59 etc. (i.e. an odd number of tens, plus a number from one to nine), the numeral *déag* "ten" appears in the Post-Head position. The twenties position may be empty, or it may contain the conjunction *is* plus a number of twenties, e.g., *is fiche* "and twenty", *is dha fichid* "and two twenties", *is trí fichid* "and three twenties", *is ceithre fichid* "and four twenties." If the number of items is more than twenty, the number of twenties appears here.

Plurals are formed by initial consonant mutation. The basic (singular) form of every noun begins with a "plain" consonant, *b*, *d* or *g*. This form is used if there is one item or a factor of ten plus 1 (e.g., 11, 21, 31, 41, etc.). If there are two through six items, or a factor of ten plus two through six items, the initial consonant is followed by an *h*, i.e., *bh*, *dh* and *gh*. If there are seven through ten items, or a factor of ten plus seven through nine items, the initial consonant of the head is preceded by an *m* or an *n*. The *m* occurs before *b*, and the *n* occurs before *d*. There are no examples of what happens to an initial *g* in this situation.

There are a number of ways that students tried to explain this complex system. To get full credit for H3, they needed to notice the various positions, mention what occurs in each position, and correctly state the consonant mutation rule.

On the next page, there is a table which shows the problem ENPs analyzed according to this system:



(H) Counting in Irish (3/4)

Pre-Head	Head	Post-Head	Twenties	Meaning
	garra	amháin		1 garden
	gasúr	déag		11 boys
ocht	mballa		is dhá fichid	48 walls
dhá	gharra	déag	is ceithre fichid	92 gardens
trí	bhád			3 boats
seacht	ndoras	déag		17 doors
seacht	mbád	déag	is dhá fichid	57 boats
naoi	nduine	déag	is fiche	39 people
ceithre fichid	doras			80 doors
cúig	bhalla			5 walls
sé	ghasúr		is trí fichid	66 boys
deich	mbád			10 boats
sé	dhuine			6 people
trí	dhoras		is dhá fichid	43 doors
	garra		is ceithre fichid	81 gardens

Grading:

H1: 3.75 points. For each solution, minus 0.3 points for the wrong word and 0.45 points for the wrong number.

H2: 10.5 points. There is a syntactic and a morphological component to this problem. Most of the points were allocated to the syntactic component:

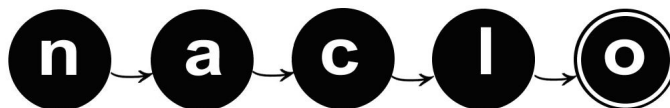
- Syntax: 9 points. For each solution, minus 0.75 points for getting the right words in the wrong sequence. Minus 0.75 points for getting the wrong words but overall getting the syntax correct (i.e., some points are given if the student understands how the number system works, but is confused about the vocabulary).
- Morphology: 1.5 points. There are 10 words that students could get the morphology wrong on in H2—the head nouns (6) and four examples of the word for "twenty." Minus 0.15 points for each mistake. If the student gets the wrong head noun, they lose points already via the syntactic part of the problem. However, they still get points if they notice the correct morphological pattern, even though the actual word is wrong.



(H) Counting in Irish (4/4)

H3: 0.75 points. Students must mention how ones, tens and twenties are indicated in the number system. Minus 0.3 points for missing one or more of these. Students must notice that initial consonants of the head nouns change, and correctly identify the pattern (number 1 = plain consonant, 2-6 consonant+h, 7-10 n or m + consonant). Minus 0.3 points for missing this. Minus 0.15 points for lack of clarity.

Total: 15 points



(I) A Large Spoon is Enough (1/3)

Nouns fall into 3 classes, marked by prefixes which also attach to agreeing adjectives. Verbs agree in class and number with their subject, also marked by a prefix. The trick is that there is some convergence between two of the classes (*m-* in singular, different in plural), so you have to figure out which class an *m-* noun belongs to.

The classes are:

- (A) *m-/wa-* marks verbs as *a-/wa-*
- (B) *ki-/vi-* marks verbs as *ki-/vi-*
- (C) *m-/mi-* marks verbs as *u-/i-*

Vocabulary:

<u>Nouns:</u>	<i>tu</i>	man	Class A
	<i>toto</i>	child	Class A
	<i>siwa</i>	island	Class B
	<i>azi</i>	potato	Class B
	<i>falme</i>	king	Class A
	<i>fuko</i>	bag	Class C
	<i>jiko</i>	spoon	Class B
	<i>wavuli</i>	umbrella	Class C

<u>Adjectives:</u>	<i>baya</i>	bad
	<i>zuri</i>	good
	<i>kubwa</i>	large
	<i>refu</i>	long
	<i>dogo</i>	small

<u>Verbs:</u>	<i>na</i>	have
	<i>natosha</i>	be enough



(I) A Large Spoon is Enough (2/3)

II.

a. The small children have good spoons.

W	a	t	o	t	o		w	a	d	o	g	o		w	a	n	a				
v	i	j	i	k	o		v	i	z	u	r	i									

b. A long umbrella is enough.

M	w	a	v	u	l	i		m	r	e	f	u		u	n	a	t	o	s	h	a	

c. A bad potato has a good bag.

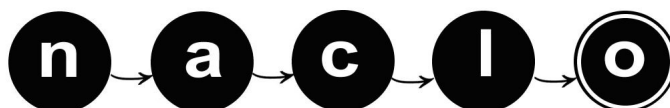
K	i	a	z	i		k	i	b	a	y	a		k	i	n	a		m	f	u	k	o
	m	z	u	r	i																	

d. Good Kings are enough.

W	a	f	a	l	m	e		w	a	z	u	r	i									
w	a	n	a	t	o	s	h	a														

e. The long island has bad rivers.

K	i	s	i	w	a		k	i	r	e	f	u		k	i	n	a		m	i	t	o
	m	i	b	a	y	a																



(I) A Large Spoon is Enough (3/3)

f. The spoons have long bags.

V	i	j	i	k	o		v	i	n	a		m	i	f	u	k	o					
m	i	r	e	f	u																	

12.

w	a	k	u	u																	
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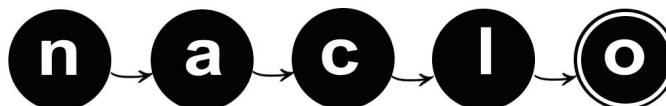
The explanation should mention that there is a choice between *wakuu* and *mikuu*, and MUST mention that the choice is based on the fact that words in the *m-/wa-* class seem to denote humans.

Grading:

11: 7/25 point for each correct **word** in (a)-(f) (max 25).

12: Up to 3 points for the correct answer and a full explanation, but 0 points if the fact that the *m-/wa-* class denotes humans is not mentioned.

Total: 10 points



2011 Solutions

(J) Axolotl in the Water (1/4)

Comparing word forms, we have the following words:

eat	<i>itlacual, notlacual</i>
see	<i>niquitta, quitta, nechitta</i>
confuse	<i>nechixcuepa, quixcuepa</i>
chocolate	<i>xocolatl</i>
dog	<i>itzcuintli</i>
house	<i>calli</i>
axolotl	<i>axolotl</i>
woman	<i>cihuatl</i>
meat	<i>nacatl</i>

This leaves us with a few tasks; namely, to determine word order, word formation (morphology), the distribution of 'in,' and a few phrasal components:

in the water	<i>ipan in atl</i>
on top of the hill	<i>ipan in tepetl</i> (by analogy with the above)
on the field	<i>ipan in milli</i> (by analogy with the above)
my father	<i>notah</i>
the man's house	<i>ical in oquichtli</i>

The only word not accounted for is the verb *nipantlalia*, which must mean 'ride.'

Most of the verbs appear to behave similarly with respect to their arguments:

(I) see (the dog)	<i>niquitta</i>
(I) ride	<i>nipantlalia</i>
(The axolotl) confuses (me)	<i>nechixcuepa</i>
(My father) sees (me)	<i>nechitta</i>

In fact, all verbs except *itlacual/notlacual* appear to have the same prefixes indicating person of the subject and object.

	<u>I</u>	<u>he/she/it</u>
me	???	<i>nech-</i>
him/her/it	<i>niqu-</i>	<i>qu-</i>

It is also possible to conceive of an alternative system where the roots of *-itta* and *-ixcuepa* are instead *-quitta* and *-quixcuepa*, and *nech-*, *niqu-*, *qu-* are instead *ne-*, *ni-*, *-*, with *ne-* triggering a change 'qu<ch'. However, in either case, the pronoun 'I' is seen to be *ni-*, and 'he/she/it' is null.



2011 Solutions

(J) Axolotl in the Water (2/4)

Now we may account for the simplest types of sentences, 3,4, and 7, where there is no possession, prepositional phrase, etc. In these sentences, the word order is verb-subject-object, with *in* before each argument (subject and object) and the verb taking the appropriate prefix(es). This VSO word order with agreement on the verb holds also for 5,8, and 9, although something more needs to be said in these cases. It appears that *ipan* signifies ‘in/on’ and takes a noun with *in*, which fully explains 5 and 8.

Let us turn our attention to 6. We have *ipan in tepetl*, which presumably means ‘on top of the hill,’ and *ical in oquichtli*, which must mean ‘the man’s house.’ Note that *ical* appears similar to ‘house,’ while *in oquichtli* must mean ‘man’ and appears in its most basic form—even though the word has never appeared before, it is apparent that it ends in *-tl/lilli*, unlike the modified *ical*. We conclude that in possessive phrases, it is the possessed object which changes accordingly, and not the possessor. In this case, the house is possessed and changes ‘*calli<ical*.’ In 9, it is again the possessed item *notah* which appears to change in some way.

The key lies in the following realization: the prefix *i-* in *ipan*, *ical*, and the verb *itlacual* is the same and indicates third person for the possessor or subject (for *itlacual*). The prefix *no-* in *notah* and *notlacual* is the same and indicates first person possessor or subject. Besides the similarity of the prefixes *i-* and *no-*, this is also indicated by the similar suffixes of *itlacual* and *cal* (and even *pan* and *tah*), in contrast with the other verbs that end in vowels.

Now, consider the sentences in J2, which will allow us to clarify a few of these details. The second sentence confirms two suspicions by showing an example of *nopan*, which we predict to mean ‘on top of me,’ as well as confirming the lack of a copula (the verb ‘to be’), a phenomenon familiar from 6. The first sentence gives an example of *tlacualli*, presumably the root for *itlacual* and *notlacual*, in the same way that *calli* is the root for *ical* (and *pantli* is the root for *pan?*). While a student may solve most of the problem without this realization, a correct translation to the first sentence will require an additional observation: *tlacualli* is in fact a noun meaning ‘food.’ More literally, the given sentences 1 and 2 mean ‘meat is the food of the dog’ and ‘chocolate is my food,’ respectively. It is also possible to account for *tlacualli* in a different way: *tlacualli* is a version of *-tlacual-* which does not have a subject; namely, a passive! In this case, *tlacualli* would mean ‘is eaten.’ However, this explanation is somewhat less appealing, because we would need to account for the distinct OVS word order in 1 and 2, as well as the distinction between the two types of words.

In fact, English prepositions are rendered in Nahuatl as so-called relational nouns, so that the phrase ‘on top of the mountain’ more literally means ‘the top of the mountain.’ This observation is, however, not necessary for the problem.

II.

Word order is VSO (verb-subject-object). Verbs are:

see	- <i>itta</i>
confuse	- <i>ixcuepa</i>
ride	- <i>pantlalia</i>



(J) Axolotl in the Water (3/4)

These take prefixes for the persons of their subjects and objects: *qu-* for third person object, *ni-* for first person subject, *nech-* for first person object. We also know that *ni-* appears before *qu-*. The bare form of each noun ends in *-tl* after vowels, *-tli* after consonants, and *-li* after *-l*. This bare form always appears with the preposed particle *in*, except sentence-initially (as in 1 and 2). The particle *in* never appears unless the noun is in its bare form. Nouns include:

meat	<i>nacatl</i>
chocolate	<i>xocolatl</i>
dog	<i>itzcuintli</i>
house	<i>calli</i>
axolotl	<i>axolotl</i>
water	<i>atl</i>
man	<i>oquichtli</i>
hill	<i>tepetl</i>
woman	<i>cihuatl</i>
field	<i>milli</i>
father	<i>'tahtli</i>
food	<i>tlacualli</i>

If the noun is possessed, it drops the suffix *-tl/tli/li* and takes a prefix for the person of its possessor: *i-* for third person, *no-* for first person. Then its possessor follows it. In exactly the same way, prepositions (*pan*, meaning 'in/on') agree with their objects, which then follow them.

Pronouns are not realized except as prefixes, and there is no copula 'to be.'

J2.

a. Axolotl tlacualli ipan nocal.

l	n		m	y		h	o	u	s	e	,		t	h	e							
a	x	o	l	o	t	l		i	s		f	o	o	d	/	e	a	t	e	n		

b. Itzcuintli nopan.

T	h	e		d	o	g		i	s		o	n		t	o	p		o	f		m	e

c. My father's father sees the axolotl.

Q	u	i	t	t	a		i	t	a	h		n	o	t	a	h		i	n			
a	x	o	l	o	t	l																



(J) Axolotl in the Water (4/4)

Grading:

J1 — 10 points

+5/3 points for word order (partial credit may be assigned)

+10/9 points for null copula

+20/9 points for subject/object prefixes (partial credit may be assigned)

+5/3 points for noticing the similarity between nouns and prepositions

+20/9 points for satisfactorily explaining sentences 1 & 2 (partial credit may be assigned)

+10/9 points for identifying and explaining the noun suffix *-li*

Maximum of 80/9 points for an incomplete answer

J2 — 5 points

+5/3 points for (a); 5/6 points for “someone eats,” 5/9 points for “we eat,” etc.

+10/9 points for (b).

+20/9 points for (c), even if *in* is overused; -5/9 points for wrong word order and/or very unreasonable *in* use, -5/9 points for incorrect agreement on a word (up to -10/9).

Total: 15 points



2011 Solutions

(K) A Script for the Ndyuka (1/3)

K1.

a **sa** kon tyali patili go na ndyuka
A

de **taki** mi mu oloko moni fosi
B

a **siki fu mi**
C

mi **sa go** na ati osu
D

fu a papila di yu be gi **afaka**
E

tu bolo
F

fa mi sa du

masa gadu fu **a sa gi me** ana
G

de yaki mi

mi go na **pamalibo** na lati ati oso
H

da mi ná abi losutu ye

fu mi deesi

ma mi de aga pe na **mi ede**
I

ke mi **gadu**
J

eke fa patili taki a bun gi wi

mi **bigi** na ini a ulotu
K

oli ulotu

ma mi de aga **siki fu dede**
L

mi masa

di mi ná **abi moni**
M

da na dati mi e begi

ala mi noso poli na ini
N

ma mi sa taki abena
O

K2.

A = will

B = they say

C = my illness

D = I will go

E = Afaka

F = two

G = he will give me

H = Paramaribo

I = my head

J = god

K = begin

L = deathly ill

M = have money

N = all

O = But I will talk to Abena



(K) A Script for the Ndyuka (2/3)

K3.

The first thing we can note about this script is that it must be syllabic, at least roughly: if it were alphabetic (one symbol per sound), it would have to be about twice as long, and there would be fewer different symbol types. That each unit is a syllable is suggested further by the way Afaka spaces the symbols; he seems to be dividing them into units of one to three symbols, and we can see from the Roman transcription that most Ndyuka words are one to three syllables, almost all Consonant-Vowel in shape.

The long bar mark seems to be punctuation; since they divide the text into exactly 23 pieces, and we've been told that there are 23 phrases, it's very likely that it marks a phrase boundary. Counting syllables and matching phrases by length is possible, but is complicated greatly by the fact that we cannot know at the outset how many syllables are in each incomplete phrase. We can get further by matching based on word boundaries, but Afaka's spacing is narrow and often ambiguous. (Both of these tactics, however, will prove useful as part of a larger strategy.)

The easiest tactic at the outset is to try to identify repeated words and syllables. Even with the blanks, we can see that the *mi* is very common, especially towards the beginnings of phrases. (This furthermore suggests that *mi* = "me", since Afaka is mostly talking about himself.) There is likewise one symbol ψ that very often occurs as one of the first two syllables of a phrase.

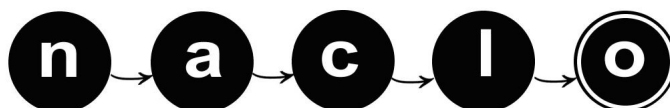
We can determine the identity of many of the short complete phrases (*mi masa*, *fu mi sa du*, *de yaki mi*, *fu mi deesi*) from the position of *mi*, and the positions of the common syllables *ma*, *fu*, *sa*, and *de*. We now know the identity of some of the most common Ndyuka syllables:

$$mi = \psi, ma = \theta, sa = \delta, de = \theta, fu = \omega$$

(We also see from *sa* that letters are occasionally rotated 180° to no apparent effect, which will aid the later identification of *ga*.)

With these correspondences, the rest of the decipherment is straightforward, and proceeds in the same manner.

The translation of these phrases into English should likewise be straightforward. Identification of the common function words *mi* ("me"), *a* ("he"), *de* ("they"), *yu* ("you"), *sa* ("shall"), *fu* ("for"), and *na* ("not") should make the identification of longer words straightforward, as will the fact that these and most other words are clearly derived from the English counterparts. We suspect, in fact, that by the end of this problem you were already *taki ndyuka na yu ede*.



(K) A Script for the Ndyuka (3/3)

Grading:

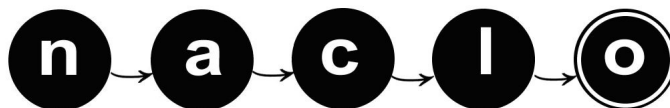
K1: 0.3 points per correctly filled in blank.

K2: 0.3 points per correct translation. The translations are all or nothing, but there's no single right answer to them (i.e., synonyms of the answers listed in this solution get full credit as well).

K3:

- Up to 1.2 points for some basic observations about the system: for mentioning that it's a syllabary, that it's broken into words, that some glyphs rotate to no apparent change, and similar observations.
- Up to 2.4 points for a logical route through the problem to an answer. Full credit on this is reserved for contestants that don't just give a travelogue of their thought (e.g., "At first I thought x would work, but I was wrong, so I tried y instead..."), but whose route takes the reader on the inevitable logical path from the observed data to their conclusion.
- Up to 1.2 points for noticing the probable etymologies of the function words (like de, sa, fu, etc.). Just a good description of their syntactic behavior is enough for half credit.
- Up to 1.2 points for overall clarity and elegance.

Total: 15 points



2011 Solutions

(L) Swallow the Salt (1/3)

Word order: Subject Verb Object (in passive voice, the noun is the subject).

Person and number are prefixed to the verb. Even if the subject is a noun, the prefix is added:

1st p.sg. — aʎa-

3rd p.sg. — a-

3rd p.pl. — i-

Tense combined with polarity follows:

Positive:

past -∅-

present -b-

future -te-

Negative:

past -ne-

present -se-

Voice follows:

active -∅-

passive -t-

causative (passive) — one of: š, z, s, ʒ. It must be the same as the sibilant in the stem. If there is no sibilant in the stem, s is used.

Verbs are suppletive based on voice. An interesting fact is that the active voice uses Songay stems, while the passive and causative voices use Berber stems.

Pronouns are the same as the verb prefixes (him/it – a, them – i).

LI.

a. aryen a-ne-t-išu

T	h	e		w	a	t	e	r		w	a	s		n	o	t		d	r	u	n	k	



(L) Swallow the Salt (2/3)

b. aya-s-uswud feji

l		h	a	d		t	h	e		s	h	e	e	p		w	a	t	c	h	e	d	

c. cidi a-te-t-elmez

T	h	e		s	a	l	t		w	i	l	l		b	e								
s	w	a	l	l	o	w	e	d															

d. a-se-dini jifa

H	e		i	s		n	o	t		t	a	k	i	n	g		t	h	e				
c	o	r	p	s	e																		

L2.

a. He is having the water taken.

a	b	z	u	b	u	z		a	r	y	e	n											

b. I'm having them walked.

a	y	a	b	3	i	3	u	w	e	n	k	e	t		i								

c. The chief did not drink the water.

a	m	a	n	o	k	a	l		a	n	e	n	i	n		a	r	y	e	n			



(L) Swallow the Salt (3/3)

d. The salt was not looked for.

c	i	d	i		a	n	e	t	e	g	m	i								

e. He will have the salt gathered.

a	t	e	s	e	f	r	e	d		c	i	d	i							

L3.

Answers should incorporate the features of Tadaksahak presented on page 1/3 of this solution.

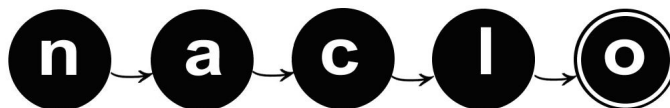
Grading:

L1: 1 points each.

L2: 4/3 points each.

- L3:
- Person+number prefixes - 4/3 points for all 3.
 - Tense+polarity prefixes - 2 points for all 5.
 - Voice prefixes - 2/3 points for active, 2/3 points for passive, and 2 points for causative (including the assimilation).
 - Prefix order and word order - 2/3 points
 - "Pronouns are the same as the verb prefixes" - 2/3 points
 - Explaining suppletivism based on voice (not necessarily using these terms) - 4/3 points.

Total: 20 points



2011 Solutions

(M) Word Salad (I/I)

M1.

The most likely possibility is “my dog is in the school”. Other grammatical options include “my school is in the dog” or “the school is in my dog” (both quite improbable physically), or “the dog is in my school” (less likely for Charlie to refer to it as “my school,” since it's Jane's also).

M2.

Charlie wrote something close to either “our team beat Jefferson High” or “Jefferson High beat our team.”

M3.

Many of the words on this list carry negative sentimental orientation, e.g., “risible,” “awful,” “plague,” so it's likely to be a negative review. It's not entirely clear, as there are also some positive words, “cool,” and perhaps “pretty,” but there are fewer.

M4.

Two possible sentences are: “The dialogue was bad, and the special effects were not thrilling,” and “The dialogue was not bad, and the special effects were thrilling.”

Grading:

M1:

- a. 10/9 points
- b. 10/9 points (5/9 points for each sentence)
- c. 10/9 points (5/9 points for each explanation)

M2: 5/3 points

M3: 25/9 points

M4: 20/9 points (10/9 points for each sentence)

Total: 10 points



2011 Solutions

(N) Stopping and Flapping in Warlpiri (1/4)

The 'father' words show us that the second consonant sound is *rd* in all dialects in the basic word and when followed by *ku*. Dialects A and B “change” this sound to *rt* when followed by *-rlangu*, while Dialect C maintains the *rd* sound.

There are several more examples of this same pattern in the dataset:

- in the 'aunt' words: *rt* in A & B preceding *rla*, but *rd* in C.
- with the final consonant in 'tooth' words: *rt* in A & B preceding *rla* or *rli*.
- in the 'smoke' words: *rt* in A & B preceding *rlu*

What is common to *rlangu*, *rla*, *rli* and *rlu* is the initial consonant, *rl*.

The same pattern is also found with the 'hold' words: *rt* in A & B preceding *rni* or *rnu*, the common factor being *rn*.

Now we can see that if a word has *rd* as its last consonant, then in A & B it is pronounced as *rt* if a suffix starting with *rl* or *rn* is added. Given that these sounds have something in common, i.e., they are retroflex sounds, we might expect this behavior before all retroflex sounds. This is a hypothesis we would want to test.

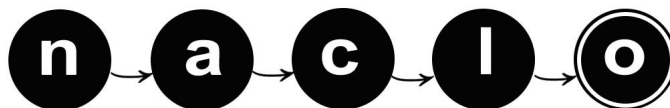
Another observation is that all dialects have words pronounced with both *rd* and *rt* sounds. Our problem is to explain the distribution of these sounds in each dialect.

When we look at the distribution of these sounds in basic words, we find that dialects B & C behave the same way and both contrast with dialect A. We notice that dialect A never has *rd* word-initially, only *rt*. B & C have both *rd* and *rt* word initially.

What is common to all three dialects is that inside basic words, *rd* is allowed if the following consonant is not retroflex (and it is *not* the word-initial consonant in A), but that only *rt* is found if the following consonant is retroflex. Contrasting pairs of words such as 'heel' (*rtari* in all dialects) and 'raw' (*rtarri*, *rdarri*, *rdarri*) or 'accompany' versus 'summit' illustrate this difference. (Notice that *rtari* is consistently pronounced when in the compound *marnangkartari*).

We notice that in 'tooth', the first word-internal consonant is *rt* in all dialects, as it is followed by the retroflex *rd* sound. The variation in the pronunciation of this second word-internal consonant (whether *rd* or *rt*) depends on the initial consonant of the suffix in dialects A & B, but not in C, where it is consistently *rd*. *Kurturdu* ('heart') provides another example: first word-internal consonant is *rt* in all dialects, since it is followed by retroflex sound *rd*. Note that this sound is followed by the non retroflex *rr* sound.

What is missing from the list of words is any example of a contrast between *rd* and *rt* in exactly the same environment within any of the dialects; linguists say that the contrast between *rd* and *rt* never distinguishes a 'minimal pair' in the way that say 'b' and 'p' do in English *bit* versus *pit*.



2011 Solutions

(N) Stopping and Flapping in Warlpiri (2/4)

How has this variation come about within Warlpiri dialects?

It would seem that Dialect A is the most conservative dialect, i.e., closest to the original “mother” or “ancestral” Warlpiri, in which the *rt* sound was pronounced as *rd* between vowels only if the next consonant was not also a retroflex sound. This same rule applies in Dialect B, except that it is less restrictive, as it is pronounced as *rd* except if followed by another retroflex consonant (not restricted to *between vowels*). Notice that it's easier to explain the distribution in B by assuming that *rd* is the basic sound and that it is pronounced as *rt* when followed by another retroflex sound.

Dialect C is the most radical of the dialects: like B, *rd* is the basic sound. Inside basic words, this dialect has an *rt* sound where the following consonant is retroflex, but it allows *rd* elsewhere. The pronunciation of the *rd* sound when it is the last consonant in a word is not affected by the initial consonant of any suffix. We can see that the “rule” for turning *rd* into *rt* in dialect B when suffixes are added to a word does not operate in Dialect C, where *rd* and *rt* are lexically determined, or are stipulated as part of the dictionary entry for basic words. In the other dialects, A & B, these sounds represent two ways of pronouncing a single consonant; whether it is pronounced as *rt* or *rd* depends on the “environment” of the consonant within the word. In A, the *rd* variant is the most restricted (if not word-initial and not followed by retroflex consonant), whereas in B, it is the *rt* variant which is the most restricted (not if followed by retroflex consonant).

N1.

In Dialect A

y	a	r	t	a	r	n	i										
---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--

In Dialect B

y	a	r	t	a	r	n	i										
---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--

In Dialect C

y	a	r	d	a	r	n	i										
---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--

N2.

In Dialect B

r	t	i	r	i													
---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--

In Dialect C

r	t	i	r	i													
---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--



2011 Solutions

(N) Stopping and Flapping in Warlpiri (3/4)

N3.

In Dialect A

r	t	u	p	a													
---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--

In Dialect B

r	d	u	p	a													
---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--

N4.

In Dialect A

k	a	p	i	r	t	i	r	l	a	n	g	u					
---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--

In Dialect B

k	a	p	i	r	t	i	r	l	a	n	g	u					
---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--

In Dialect C

k	a	p	i	r	d	i	r	l	a	n	g	u					
---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--

N5. The sound **rd** never occurs in Dialect **A** at the **start/beginning** of a word.

N6. TRUE

N7.

- rd* is permitted in A if... **not initial AND/OR not followed by retroflex sound/r, rd, rl, rn, rt** (may group sounds as retroflex or list relevant sounds in answer).
- rd* is permitted in B if... **not followed by retroflex sound/r, rd, rl, rn, rt** (may group sounds as retroflex or list relevant sounds in answer).
- rd* is permitted in C if... **not followed by retroflex sound/r, rd, rl, rn, rt within basic/lexical/dictionary/ simple word** (may group sounds as retroflex or list relevant sounds in answer).



2011 Solutions

(N) Stopping and Flapping in Warlpiri (4/4)

Grading:

N1: 3 points (1 point each)

N2: 1 point (0.5 points each)

N3: 1 point (0.5 points each)

N4: 1.5 points (0.5 points each)

N5: 1.5 points (must fill in **all** of the blanks correctly to receive credit)

N6: 0.5 points

N7: 1.5 points (0.5 points each)

Total: 10 points

