<A> A Case of Pali (1/3)

<10 points>

Pali is a dead language, like Latin. It was a literary language related to Sanskrit, the ancestor of modern languages spoken in Northern India, such as Hindi and Urdu. Pali was first written down around 100 BCE in Sri Lanka by Buddhist monks to preserve the teachings of the Buddha. Pali used to be written in the Brāmī script, but it is also written in the Roman alphabet (which we'll be using here). Pali is still used by Buddhist monks and scholars (just as Latin is still used in the Vatican by Catholic priests and theologians).

Pali is a highly inflected language, which means that the main words such as nouns and verbs get a range of endings (called "suffixes") or beginnings (called "prefixes") attached to make it clear what role the word is playing in the sentence. English also has some inflections, just not as many as Pali. Here are some examples of English inflections:
- *house – houses* . The –s added to the end of a noun like "house" indicates that there is more than one you are talking about.
- *John – John's coat*. The 's is used after a noun to indicate possession.
- *I walk. You walked. He walks. She has been walking*. The suffixes added to the verb "walk" give you sense of a different person doing the walking, or the walking taking place at a different time – past as opposed to the present.
- *like – dislike*. Adding "dis-" to the beginning of a word such as "like" creates its opposite.

Pali has different consonant and vowel sounds, which explains the use of diacritics (special symbols) above or below particular letters. These do not matter for solving this puzzle.

Here are some sentences in Pali with their English translations:

Pali	**English Translation**
mahāmatto nisīdati	The minister sits down.
mahāmattam upasaṃkamanti	They go to the minister.
samaṇo tathāgato hoti	The philosopher is enlightened.*
samaṇe atthaṃ pucchanti	They ask the philosophers the meaning.
upāsako pucchati	The lay disciple asks.
loko mahāmattassa	the minister's world

* The term tathāgato is literally "thus-gone", but it is used in Pali Buddhist texts to refer to enlightened beings.

Note also, Pali texts do not use capital letters or punctuation.

<A> A Case of Pali (2/3)

Task 1: Translate the following English sentences into Pali, entering one letter in each box, ignoring the diacritics:

1. The minister asks the philosophers.														
2. The philosopher sits down.														
3. They sit down.														

The additional Pali words given here are in their dictionary form (which is the same as the subject form, without any suffixes):

Pali	English
rājo	king
devo	god
gāmo	village

Task 2: Translate the following into English, writing one letter in each cell, leaving an empty cell between words.

1. rājo nisīdati																		
2. rājo gāmassa devo hoti																		

<A> A Case of Pali (3/3)

Task 3: Translate the following into Pali, entering one letter in each box ignoring the diacritics:

1. The minister asks the kings.																	
2. The lay disciple's village.																	
3. The meaning of the world is god.																	

<B> Deer Father (1/1)

<12 points>

The following is a poem from the Peruvian poet Sisku Apu Rimac ("Sisco who talks to the spirits"). Apu Rimac wrote in both Spanish and in his native language, Quechua. Varieties of Quechua are spoken by roughly 10 million people in the Andes mountains of Peru, Ecuador, and Bolivia. Like the traditional poems and song lyrics that served as Apu Rimac's inspiration, his poetry is frequently melancholy and mournful, and common themes include yearning for a lost love and the nostalgia of urban Quechua people for their mountain homelands.

Task 1: We have taken the eight couplets from the Quechua version of the poem, on the right, and scrambled them into a random order. Can you match them up to their English translations on the left? (Note: *Vicunya, kule,* and *puku* are kinds of animal.) Write the letter indicating the Quechua couplet on the line preceding its English translation.

____	1.	For what, God, Did you create my suffering?	A. Kule kuleq thapanpichus Taytallayri churyawarqa
____	2.	Did you never know What happiness is?	B. Kunan kuna waqanaypaq Urqun qasan purinaypaq
____	3.	Maybe in the nest of the pukus My dear mother gave birth to me.	C. Wikunyachus mamay karqa Tarukachus taytay karqa
____	4.	Maybe in the cradle of the kules My dear father engendered me	D. Manataqchu yacharqanki Imaynas kawka kayta
____	5.	Like the poor puku I endure the cold winds.	E. Imapaqmi Apu Tayta Nyak'ariyta kamarqanki
____	6.	Or the poor kule I cry as I suffer.	F. Puku unya hina Chiri wayra muchunaypaq
____	7.	Perhaps my mother was a vicunya; Perhaps my father was a deer;	G. Puku pukuq qesanpichus Mamallayri wachawarqa
____	8.	And for these reasons I cry wandering through the highlands.	H. Kule unya kaqlla Nyak'arispa waqanaypaq

Task 2: How would you say the following in Quechua?

poor						suffer						
mother						deer						

Task 3: What element in a Quechua sentence marks the sentence as expressing some uncertainty or merely a possibility?

Task 4: What is the literal meaning of *Apu Tayta*?

<C> Grammar Rules! (1/3)
(14 points)

One way for computers to understand language is by parsing sentences into smaller pieces to figure out the role of each word. A context free grammar (CFG) (also called phrase structure grammar) is a set of rules for forming sentences. Only sentences that can be generated using such a set of rules are then deemed grammatically correct and 'well-formed'. Computer scientists and linguists use CFGs to define and parse languages, where a "language" is defined as any and all sentences that the CFG can generate. S is the starting symbol.

The following rules, expressed in the Backus–Naur Form (a computer science term), make up a simple CFG:

$$S \rightarrow N\ V \qquad N \rightarrow children \qquad N \rightarrow squirrels$$

$$V \rightarrow sing \qquad V \rightarrow eat$$

Each rule says that the element to the left of the arrow can be expanded into the elements to the right of the arrow. By repeatedly replacing symbols, this CFG can expand the symbol S into "squirrels sing", "children sing", "squirrels eat", and "children eat". It cannot, however, generate "children eat squirrels" or "squirrels eat children" or just "children" – you can see that there is no possible sequence of replacements that turns S into either of these.

The following is another simple CFG:[1]

1. S → NP VP	2. VP → VP PP	3. PP → P	4. IV → runs
5. NP → N	6. VP → VP CONJ VP	7. PP → P NP	8. C → that
9. NP → D N	10. N → squirrel	11. TV → chases	12. P → in
13. NP → NP CONJ NP	14. N → he	15. TV → eats	16. P → away
17. VP → IV	18. N → John	19. TV → catches	20. CONJ → and
21. VP → IV PP	22. N → Mary	23. TV → tells	24. D → the
25. VP → TV NP	26. N → dog	27. TV → sees	
28. VP → TV C S	29. N → tree	30. IV → sits	

A sentence analysed as an expansion of S using a CFG can be represented by a tree diagram, e.g.:

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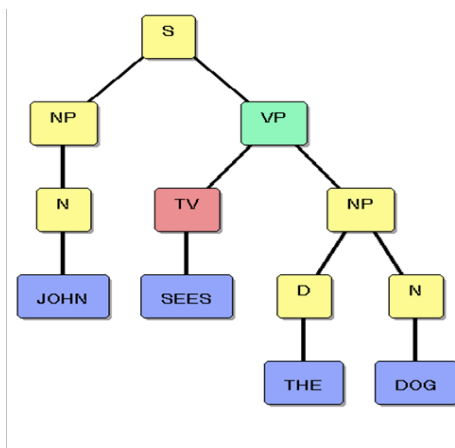
[1] The rules are numbered for your convenience, but the numbers are not part of the rules.

<C> Grammar Rules! (2/3)

Here is a simple story. While several of the sentences making up this story are, according to the above CFG, well formed, others are not, meaning they cannot be derived from S by repeated substitution of symbols.

- A.   John sees the dog and Mary sees the dog.
- B.   The dog sees John and Mary.
- C.   The dog sees a squirrel.
- D.   The squirrel sits in the tree.
- E.   That squirrel sees the dog.
- F.   The squirrel was seen by the dog.
- G.   The dog runs.
- H.   The squirrel in the tree runs.
- I.   The dog chases the squirrel and eats the squirrel.
- J.   The dog eats.
- K.   John sees that the dog eats the squirrel.
- L.   John tells Mary that the dog eats the squirrel.
- M.   The dog sees that John sees that he eats the squirrel.
- N.   And the dog runs away.
- O.   Mary and John chase the dog.
- P.   John chases and catches the dog.
- Q.   John eats dog.

Task 1: List the seven sentences that the CFG (Rules 1-30 on previous page) can generate by writing the letter corresponding to the sentence in the boxes below (one letter per box). (Ignore full stops.)

<C> Grammar Rules! (3/3)

Not all of the sentences that this CFG can generate are actually sentences of English. For example, "The dog and the squirrel sits" can be generated, but this isn't a correct sentence of English.

Task 2: Which sentence in the above story correctly generated by the rules is odd or inappropriate in the context of the story? Answer by writing the sentence letter in the box below.

☐

Task 3: One of the rules in the CFG above (numbered 1-30) is redundant: any sentence that it can generate can already be generated by other rules. Which rule is it? Write its number in the box below.

☐

<D> Playing the cognate game (1/4)

<22 points>

Indonesian (*Bahasa Indonesia*) is an Austronesian language widely spoken as a first or second language throughout the countries of Indonesia and East Timor. It is closely related to Malay, which is spoken in Malaysia, Brunei, and Singapore. Swahili (*Kiswahili*) is a Bantu language spoken natively by many groups living on the coast of East Africa and as a second language throughout Kenya, Tanzania, Uganda, the Comoros, Mozambique, Burundi, Somalia, Rwanda, and the Democratic Republic of the Congo. These two languages are *lingua francas*, used for trade, business, and education among peoples with different mother tongues.

Though they originated on different continents and come from different language families, Indonesian and Swahili share a substantial amount of vocabulary, thanks primarily to loans from Arabic, but also from English, Portuguese, and German/Dutch. While many of these loans are related to commonly-loaned domains such as technology, religion, or animals (compare the Swahili word for "lion," *simba*, with the Indonesian *singga*), some are for more everyday items such as "table" (Swahili *meza*, Indonesian *meja*, from the Portuguese *mesa*). Below are three tasks related to identifying Indonesian and Swahili cognates, but be careful: not everything is as it seems!

Task 1: Match each English sentence with its Indonesian and Swahili translations taken from the sentences in the Table below. Note that the order of the Indonesian sentences has been jumbled, so that Swahili sentence '1' might not be translated by Indonesian sentence 'A' and so forth.

	Swahili:		**Indonesian:**
1	Aliniuza kitabu changu.	A	Bawakan saya buku-tulismu.
2	Dada wangu anajifunza kemia.	B	Bawalah buku-buku kalian ke sekolah.
3	Hijabu ya dada wangu ni rangi ya bluu.	C	Besok Anda ke Mesri.
4	Jana nilisoma biblia.	D	Di Bahasa Swahili Anda bisa berbicara apa kabar.
5	Katika Kiswahili unaweza kusema habari gani.	E	Dia menjual saya bukuku.
6	Kesho utakwenda Misri.	F	Hari ini hari kamis.
7	Kitongoji hiki ni salama.	G	Jilbab kakakku adalah biru.
8	Leo ni alhamisi.	H	Kakakku belajar kemia.
9	Leteni vitabu vyenu kwa shule.	I	Kemeja adikku adalah hijau.
10	Nilete daftari lako.	J	Kemejanya di pahanya.
11	Nina vitabu kuhusu Wayahudi.	K	Ketika hari jumat saya berdoa.
12	Ninajifunza biologia.	L	Lingkungan ini selamat.
13	Ninapenda bendera Kiholanzi.	M	Menurut daftarnya Anda miskin.
14	Ninasema Kiswahili.	N	Saya belajar biologi.
15	Orodha hii inasema kwa wewe ni meskini.	O	Saya bisa berbahasa Swahili.
16	Shati la kaka wangu ni rangi ya kijana.	P	Saya membaca al-kitab kemarin.
17	Shati lake ni juu ya paja lake.	Q	Saya punya buku tentang Yahudi-Yahudi.
18	Siku za ijumaa ninaomba.	R	Saya suka bendera Belanda.
19	Sikuwa na wakati ijumaa.	S	Saya tidak punya waktu hari jumat.
20	Wilaya hizi ni salama.	T	Wilayah-wilayahnya selamat.

<D> Playing the cognate game (2/4)

Complete Task 1 by using the number corresponding to the appropriate Swahili sentence and the letter corresponding to the appropriate Indonesian sentence.

English	Swahili	Indonesian
Bring me your notebook.		
Bring your books to school.		
He sold me my book.		
His shirt is on his thigh.		
I didn't have time on Friday.		
I have books about Jews.		
I like the Dutch flag.		
I speak Swahili.		
I study biology.		
In Swahili you can say what's new.		
My brother's shirt is green		
My sister studies chemistry.		
My sister's headscarf is blue.		
On Fridays I pray.		
These districts are safe.		
This list says that you are poor.		
This neighbourhood is safe.		
Today is Thursday.		
Tomorrow you're going to Egypt.		
Yesterday I read the Bible.		

<D> Playing the cognate game (3/4)

Task 2: Look at the Swahili-Indonesian word pairs in the Table below. Using the knowledge you have gained in doing Task 1, identify the four pairs of "misleading cognates" (better known as "false friends"); that is, identify the Swahili and Indonesian words which contain the same roots, but have different meanings.

	Swahili	Indonesian		Swahili	Indonesian
1	salama	selamat	5	kaka	kakak
2	biologia	biologi	6	meskini	miskin
3	daftari	daftar	7	kitabu	(al-)kitab
4	ijumaa	jumat	8	katika	ketika

List, in the order they appear in the Table above, each of these four pairs of 'false friends' by placing the number of the pair in column 1, and show why they are false friends by writing the meaning or translation equivalent of each word in English in columns 2 and 3:

Number of word pair	Meaning of Swahili word	Meaning of Indonesian word

<D> Playing the cognate game (4/4)

Task 3: Translate the following sentences into Swahili and Indonesian:

1	I speak Hebrew.	S	
		I	
2	I like my sister's shirt.	S	
		I	
3	He sold me a flag.	S	
		I	
4	Egypt is safe.	S	
		I	
5	He sells me a headscarf.	S	
		I	
6	Today I am reading a book.	S	
		I	
7	In Swahili you can study the Bible.	S	
		I	
8	The Dutch are poor.	S	
		I	
9	On Thursdays I read my books.	S	
		I	
10	My brother studies your book.	S	
		I	

<E> Kwak'wala Word Search (1/2)
<20 points>

Kwak'wala is the language of the *Kwakwaka'wakw* people, one of Canada's many aboriginal nations. It is spoken on and around Vancouver Island, but only a few hundred fluent speakers remain.

We've hidden 30 Kwak'wala words in the puzzle below, horizontally, vertically, or diagonally, but we've only given you 10 of them. Your challenge is to find the remaining 20 words and match them to their meanings.

```
K'W  A   KW  N   I   U   A   KW  A   'M  K'  XW
G    X   T   A   Y   A   Y   A   G   A   Y   U
Y    I   DL  A   X   P'  U   G   D   TL  A   Y
'L   GW  D   U   K'  I   KW  A   DL  I   K'  A
B    A   K   A   Y   U   GW  Y   T'S DZ  I   B
K'   T'S 'M  A   KW  A   L   A   S   K'  N   I
K    I   DL  A   T'S I   B   XW  Y   T'L U   L
Y    'M  K'W I   P'  A   U   A   T'  U   XW  I
KW   G   A   I   T'S N   Y   S   'L  B   U   XW
X    TS  N   L   I   P   A   A   A   TS  K   U
D    U   K'  T'  T'S L   GW  I   G   XW  A   N
XW   S   A   L   A   K   A   Y   A   A   'M  I
I    K'  D   P   G   GW  'M  B   KW  K'W T'S T'L
A    K   A   'L  M   U   I   I   A   A   U   I
A    T'S KW  DZ  A   'L  X   TS  P   T'  K'  K
KW   A   K   I   TL  A   GW  A   K   M   A   TL
```

Notes: Some two-character sequences (or digraphs), like tl, dl, kw, gw, and ts, are treated as single letters in the Kwak'wala alphabet; underlined a represents an "uh" sound; the underlined letters k and g are pronounced like "k" and hard "g", but with the tongue further back in the mouth than for plain k and g. x is pronounced like the "h" in "human", and underlined x like the "ch" in "Bach". An apostrophe indicates that the sound is pronounced with increased glottal pressure, that is increased pressure at the back of the throat.

<E>Kwak'wala Word Search (2/2)

Enter each character in a cell as it appears in the word search cell, leaving no spaces between letters. (You may also omit underlining.)

an iron										
berry cakes	'L	A	G	A	KW					
bowl for candlefish oil										
broom	X	I	GW	A	Y	U				
deck of cards	L	I	B	A	Y	U				
dustpan										
envelope										
expert card player										
expert knitter										
fisherman	K	I	T'L	I	N	U	XW			
fishing boat										
food for dipping in oil	T'S	A	P	A	L	A	S			
knitting basket	Y	A	G	A	T'S	I				
knitting needles										
letter	K'	A	D	A	KW					
pen or pencil										
something knitted, such as a sweater										
to be proud, to be a snob	TL	A	M	K	A					
to catch fish with a net										
to dip food in candlefish oil										
to iron something	'M	A	KW	A						
to knit										
to make berry cakes										
to play cards										
to sweep										
to write	K'	A	T	A						
tourist boat, cruise ship, ferry										
wool										
wrinkled clothes										
writer										

<F> Phoenician Fun (1/2)

<22 points>

The Phoenician script can be dated at around 1050 BC from inscriptions at Byblos, and from it the Arabic, Hebrew and by extension the more precise phonemic Etruscan, Greek, Roman and Cyrillic scripts evolved. Before the adoption of this writing system, Phoenician had been written in a cuneiform script.

The Phoenician civilization was centred along the Mediterranean coast in an area known as Cana'an. The map below shows a number of Phoenician cities and nearby cities that were important trading partners. The spellings reflect their pronunciation in Phoenician. However, two of the cities on the map are shown with their modern names which are very different from what they were called in Phoenician times.

Note that two different Phoenician letters are both transliterated as H, and that PH, SH, TH, and TS represent single sounds in Phoenician.
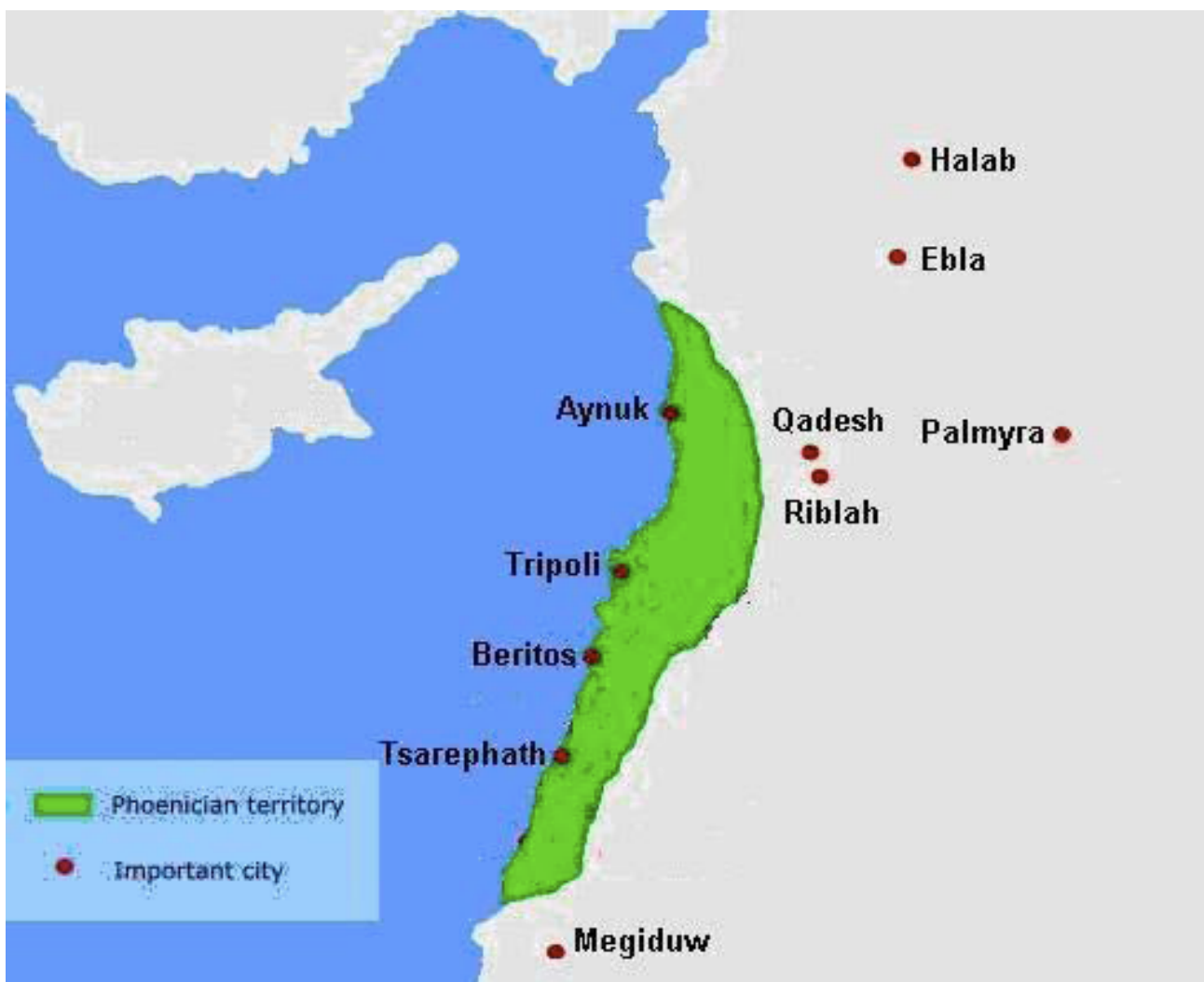
<F> Phoenician Fun (2/2)

Task 1: Match up the Phoenician names in the list below with the names on the map. Remember, two of the names will not match, so you should have two names left over.

A	⊕7◁𝔥	F	𝒴↻ꓱꓗ
B	◁ㄥᗺ	G	ㄥ◁O
C	∃ㄥ◁◁	H	◁⊕ꛬ
D	𝒴◁ꓯ𝕄	I	𝕄◁Φ
E	◁𝕄◁⊕	J	≢†◁◁

Complete Task 1 by filling in the right column of the Table below with the appropriate letter (A - J) or leave blank if one of the two leftover cities (i.e., with non-matching names).

HINT: some languages are written from Left to Right, others from Right to Left.

Aynuk	
Beritos	
Ebla	
Halab	
Megiduw	
Palmyra	
Qadesh	
Riblah	
Tripoli	
Tsarephath	

Task 2: How do you think the names of the two leftover (non-matching) cities were pronounced in Phoenician? You won't be able to tell exactly how they were pronounced (nor which is which), but write down whatever you do know about the sounds in their Phoenician names, using one cell for each sound starting from the left-most cell in each row.

Pronunciation of original Phoenician city name					