First Australian Computational and Linguistics Olympiad

STATE ROUND

Problem set

(2 hours)

YOU ARE ONLY ALLOWED TO WORK ON THE PROBLEM SET IN TWO HOURS. RETURN IT TO THE FACILITATOR AT THE END OF THE CONTEST TIME.
Lalana Chinantec is a language spoken by approximately 10,000 people who live in the Oaxaca region of Mexico. In the following orthography a colon (:) marks a long vowel, and the ? symbol marks a glottal stop (like the sound in the middle of *uh-oh*).

kalakwa: kwi: li:? The beautiful corn grew.
miładę: mo:h kya My pineapples have turned out well.
dę: kalaro:h mo:h ne kya My yellow pineapples ripened well.
kala: kwi: The corn turned out well.
mila: kwi: The corn has grown.

A1. What does the word li:? mean?

A2. What does the word ro:h mean?

A3. Translate the following sentences into Lalana Chinantec:

(i) The good pineapples became beautiful.

(ii) My ripe corn has yellowed well.

A4. Translate the following sentences into English:

(i) milar: h kwi: ne

(ii) li:? kalakwa: kwi:
Luiseño is a highly endangered language of southern California that is a member of the Uto-Aztecan language family. While it has an ethnic population of around 2,000, Luiseño is only spoken by 30 to 40 people.

An asterisk (*) at the beginning of a sentence indicates that it is not grammatical.

In the following orthography ʂ represents a retroflexed ‘s’ sound, which is made with the tongue further back in the mouth; č represents the ‘ch’ sound, as in chin; and ꞏ marks a glottal stop, which is like the sound in the middle of uh-oh.

1. hengeemal naqmaq The boy is listening.
2. nawitmal maamayuq The girl is helping.
3. ꞏawaalum waʔiwun The dogs are barking.
4. hengeemalum naqmawun The boys are listening.
5. hunwut xaariq The bear is growling.
6. wunaal naqmaq S/he is listening.
7. ꞏawaalum xaariwun The dogs are growling.
8. paaʔila heyiq The turtle is digging.
9. paaʔilam heyiwun The turtles are digging.
10. hunwutum neqpiwun The bears are fighting.
11. muutam naqmawun The owls are listening.
12. muuta kašillay noonomiq The owl is following the lizard.
13. ꞏawaal paaʔilay neqpiq The dog is fighting the turtle.
14. hengeemal nawitmal čaqalaqiq The boy is tickling the girl.
15. nawitmal hengeemal čaqalaqiq The girl is tickling the boy.
16. kašilla ꞏawaali toowq The lizard sees the dog.
17. kašillam muutay kwaʔwun The lizards are eating the owl.
18. wunaalum muutami moyooniwun They are feeding the owls.
19. ꞏawaali kašilla toowq The lizard sees the dog.
20. kašilla toowq ꞏawaali The lizard sees the dog.
21. ꞏawaali toowq kašilla The lizard sees the dog.
22. * toowq kašilla ꞏawaali
23. * toowq ꞏawaali kašilla
B1  Nouns in Luiseño
   a. Fill in the spaces below with the correct forms:

   bears ________
   turtle ________
   muuta ________
   kaṣillam ________

   b. What endings are used to mark nouns as plural?

   c. What would be the plural of ḫahiiču ‘orphan’?

   d. Briefly explain how you can predict which ending will occur with a particular noun.

B2  More Endings in Luiseño
   a. What does the ending –q mean?

   b. What does the ending –wan mean?

   c. What do the endings –y and –i mean?

   d. Briefly explain how you can predict whether –y or –i will occur.

B3  Word Order in Luiseño
   a. On the basis of these examples, what is the usual word order in Luiseño sentences?

   b. Luiseño also allows some freedom in word order. Briefly describe which variations in word order are acceptable and which are not.
B4. Speaking Luiseño
   a. How would you say ‘The dog is eating the lizards’ in Luiseño?

   b. Give two additional sentences in Luiseño that you predict will be grammatical.

   __________________________________________
   __________________________________________

   c. Give two more you predict will be ungrammatical.

   __________________________________________
   __________________________________________

   d. Briefly state why the ungrammatical ones are incorrect.

Problem created by Jean Mulder 2008
Data from Dryer, M. (1987) Manual for Descriptive Language Analysis ,
2nd edition. Edmonton: Linguistics Department, University of Alberta.
In English, we can combine two nouns to get a compound noun, such as in ‘mailbox’ or ‘sandcastle’. We can do this in Japanese as well, but just sticking the two words together isn’t enough. Instead, the words themselves undergo predictable changes:

ikebana
‘flower arranging’
ike
‘arrange’
hana
‘flower’

asagiri
‘morning fog’
as
‘morning’
asa
‘morning’
kiri
‘fog’

hoshizora
‘starry sky’
hoshi
‘star’
sora
‘sky’

Compound words can then be compounded again, creating compounds with three or more members. Study the diagrams below carefully. You’ll notice that the order in which the compound is built affects both the meaning and the final form of the word.

nurihashibako
‘lacquered box for chopsticks’
nuribashibako
‘box for lacquered chopsticks’

hashibako
‘box for chopsticks’
nuribashi
‘lacquered chopsticks’
nuri
‘lacquered’
hashi
‘chopsticks’
hako
‘box’
hako
‘box’

C1. The following is a list of several Japanese words with their English meanings. Use this word bank to write definitions of the Japanese compounds (a)-(f). Be very specific with how you phrase your definition. If your definition is ambiguous (has two meanings), it will not be counted.

<table>
<thead>
<tr>
<th>sakura</th>
<th>cherry blossom</th>
<th>kami</th>
<th>paper</th>
<th>nise</th>
<th>fake</th>
</tr>
</thead>
<tbody>
<tr>
<td>shiru</td>
<td>soup</td>
<td>tana</td>
<td>shelf</td>
<td>tsukuri</td>
<td>maker</td>
</tr>
<tr>
<td>iro</td>
<td>color(ed)</td>
<td>tanuki</td>
<td>raccoon</td>
<td>hako</td>
<td>box</td>
</tr>
</tbody>
</table>
C2. Match the following four-member Japanese compound words on the left with their English meanings on the right. (Some will require you to stretch your imagination a bit!) One of the Japanese words will correspond to two possible English meanings.

<table>
<thead>
<tr>
<th>(a) nisetanukijiru</th>
<th>(A) nisegamidanadzukuri</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b) nisedanukijiru</td>
<td>(B) nisekamitanadzukuri</td>
</tr>
<tr>
<td>(c) irogamibako</td>
<td>(C) nisegamitanadzukuri</td>
</tr>
<tr>
<td>(d) irokamibako</td>
<td>(D) nisegamidanadzukuri</td>
</tr>
<tr>
<td>(e) nisezakuradana</td>
<td></td>
</tr>
<tr>
<td>(f) nisesakuradana</td>
<td></td>
</tr>
</tbody>
</table>

C3. Explain your answers to C1 and C2 in the space provided below.
(D)Thorny Stems

Wouldn’t it be nice if your computer could understand English? In this problem, you will write down a small set of rules encoding one piece of your knowledge about English.

The problem you will approach is called “stemming.” You know that “work”, “working”, “works”, and “worked” are all forms of the same verb: “work”. Similarly, “guesses” and “guess” are both forms of the same noun: “guess”. Below you will find a list of pairs of a word and its stem, both nouns and verbs. Your goal is to write down a list of rules which is as short as possible, but covers all of the example pairs. You must also list exactly one exception for every rule which has one.

Example

Rule 1: If a word ends in _ss_, then replace _ss_ with _ss_ to form the stem.
Rule 2: If a word ends in _s_, then replace _s_ with _ to form the stem.
Rule 3: Otherwise the word is its own stem.

Let’s look at how these rules will apply to a few examples. We always use only the first numbered rule that applies. For the word “work”, Rules 1-2 do not apply, so we are left with Rule 3, “work” is its own stem. For the word “works”, Rule 1 does not apply, but Rule 2 does, so the stem of “works” is formed by replacing the final “s” with nothing - i.e. deleting it, to form “work”. Finally, for the word “grass”, Rule 1 does apply, and so we replace “ss” with “ss”, i.e. the word is unchanged and then we stop.

Your goal is to write one list of rules which will apply to both the nouns and the verbs listed on the next page.

Exceptions

The rules you write will not always work. Any word for which your rules give the wrong stem is called an “exception”. You will write down exceptions for your rules - an exception is written next to the first rule whose “if” part applies to it. For example, “guess” is not an exception to the rules above, since even though Rule 2 does not handle it, Rule 1 (which comes first) does. However, “cries” is an exception (these rules gives its stem as “crie” instead of “cry”), and it should be written next to Rule 2 as follows:

If a word ends in _ss_, then replace _ss_ with _ss_ to form the stem. Exception: -none-
If a word ends in _s_, then replace _s_ with _ to form the stem. Exception: cries
Judging
Your score will be determined according to the following criteria:
   You should have rules to cover all the words in the list below.
   You should use as few rules as you can.
   You should list an exception next to as many rules as you can.

Words and stems

<table>
<thead>
<tr>
<th>NOUNS</th>
<th>VERBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>word</td>
<td>stem</td>
</tr>
<tr>
<td>backs</td>
<td>back</td>
</tr>
<tr>
<td>books</td>
<td>book</td>
</tr>
<tr>
<td>chiefs</td>
<td>chief</td>
</tr>
<tr>
<td>companies</td>
<td>company</td>
</tr>
<tr>
<td>duties</td>
<td>duty</td>
</tr>
<tr>
<td>dwarves</td>
<td>dwarf</td>
</tr>
<tr>
<td>grass</td>
<td>grass</td>
</tr>
<tr>
<td>moss</td>
<td>moss</td>
</tr>
<tr>
<td>potatoes</td>
<td>potato</td>
</tr>
<tr>
<td>presidents</td>
<td>president</td>
</tr>
<tr>
<td>roses</td>
<td>rose</td>
</tr>
<tr>
<td>shelves</td>
<td>shelf</td>
</tr>
<tr>
<td>stores</td>
<td>store</td>
</tr>
<tr>
<td>stapler</td>
<td>stapler</td>
</tr>
<tr>
<td>times</td>
<td>time</td>
</tr>
<tr>
<td>toe</td>
<td>toe</td>
</tr>
<tr>
<td>tomatoes</td>
<td>tomato</td>
</tr>
<tr>
<td>wives</td>
<td>wife</td>
</tr>
</tbody>
</table>
D1. Your rules
You do not need to use all the blank rules below. Cross out any rules you do not use.

1. If a word ends in _____, then replace _____ with _____ to form the stem.
   Exception:
2. If a word ends in _____, then replace _____ with _____ to form the stem.
   Exception:
3. If a word ends in _____, then replace _____ with _____ to form the stem.
   Exception:
4. If a word ends in _____, then replace _____ with _____ to form the stem.
   Exception:
5. If a word ends in _____, then replace _____ with _____ to form the stem.
   Exception:
6. If a word ends in _____, then replace _____ with _____ to form the stem.
   Exception:
7. If a word ends in _____, then replace _____ with _____ to form the stem.
   Exception:
8. If a word ends in _____, then replace _____ with _____ to form the stem.
   Exception:
9. If a word ends in _____, then replace _____ with _____ to form the stem.
   Exception:
10. If a word ends in _____, then replace _____ with _____ to form the stem.
    Exception:
11. Otherwise the word is its own stem.

D2. Explain your reasoning in the space below.
The Curragh of Kildare

And straight I will repair
To the Curragh of Kildare
For it's there I'll find tidings of my dear

[Irish Folk Song]

In Ireland, each place name has two versions with equal legal status – an English one and an Irish one. Below are some place-names in their two versions and translations of the Irish ones.

<table>
<thead>
<tr>
<th>English</th>
<th>Irish</th>
<th>Translation of Irish name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glenamuckaduff</td>
<td>Gleann na Muice Duibhe</td>
<td>Valley of the Black Pig</td>
</tr>
<tr>
<td>Clonamully</td>
<td>Cluain an Mhullaigh</td>
<td>Meadow of the Summit</td>
</tr>
<tr>
<td>Buncurry</td>
<td>Bun an Churraigh</td>
<td>Base of the Marsh</td>
</tr>
<tr>
<td>Curraghmore</td>
<td>An Currach Mór</td>
<td>The Big Marsh</td>
</tr>
<tr>
<td>Annaghanoon</td>
<td>Eanach an Uain</td>
<td>Fen of the Lamb</td>
</tr>
<tr>
<td>Dunard</td>
<td>An Dún Ard</td>
<td>The High Fort</td>
</tr>
<tr>
<td>Bunagortbaun</td>
<td>Bun an Ghoirt Bháin</td>
<td>Base of the White Field</td>
</tr>
<tr>
<td>Gortnakilly</td>
<td>Gort na Cille</td>
<td>Field of the Church</td>
</tr>
<tr>
<td>Binbane</td>
<td>An Bhinn Bhán</td>
<td>The White Peak</td>
</tr>
<tr>
<td>Ballyknock</td>
<td>Baile an Chnoic</td>
<td>Town of the Hill</td>
</tr>
<tr>
<td>Ballynaparka</td>
<td>Baile na Páirce</td>
<td>Town of the Park</td>
</tr>
<tr>
<td>Kilcarn</td>
<td>Cill an Chair</td>
<td>Church of the Mound</td>
</tr>
<tr>
<td>Killeshil</td>
<td>An Choill Íseal</td>
<td>The Low Wood</td>
</tr>
<tr>
<td>Clashbane</td>
<td>An Chlais Bhán</td>
<td>The White Pit</td>
</tr>
<tr>
<td>Bunbeg</td>
<td>An Bun Beag</td>
<td>The Small Base</td>
</tr>
</tbody>
</table>

Sometimes the English name is no more than a translation of the Irish one:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Blackabbey</td>
<td>An Mhainistir Dhubh</td>
</tr>
<tr>
<td>17</td>
<td>Bigpark</td>
<td>An Pháirc Mhór</td>
</tr>
<tr>
<td>18</td>
<td>Castlepark</td>
<td>Páirc an Chaisléain</td>
</tr>
<tr>
<td>19</td>
<td>Woodland</td>
<td>Talamh na Coille</td>
</tr>
</tbody>
</table>
E1. What would the Irish names of the following towns and villages be? Provide a translation for each one. If you think more than one Irish name could correspond to a given English name, give all of them:

<table>
<thead>
<tr>
<th></th>
<th>English</th>
<th>Irish</th>
<th>Translation of Irish name</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Mullaghbane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Killananny</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Knocknakillady</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Gortnabinna</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Clashgortmore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Killbeg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Blackcastle</td>
<td>Black castle</td>
<td></td>
</tr>
</tbody>
</table>

E2. Explain your reasoning and provide any additional observations about this problem.