**Practice for Homework 7: Phrase structure rules**

**Question 0 (for future assignments). Lexical categories**

Which kind of complement does each word below take? Pick the option that better matches the subcategorization frame of the word, and justify your choice by creating a sentence using that complement option.

Example: *devour*  
**Choice:** DP (in fact, it would be ungrammatical to use devour with no object, as in *John devours.*

**Sentence:** John devours pizza.

<table>
<thead>
<tr>
<th>Word</th>
<th>Complement Options</th>
<th>Choice</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Eat</em></td>
<td>nothing or DP DP</td>
<td>nothing or DP DP</td>
<td>Key points about doing this problem:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1. Always make up example sentences to</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>represent both complement options.</td>
</tr>
<tr>
<td><em>Observe</em></td>
<td>DP or nothing</td>
<td>DP or nothing</td>
<td>2. Beware of confusing complements with</td>
</tr>
<tr>
<td><em>Load</em></td>
<td>nothing or DP PP&lt;sub&gt;loc&lt;/sub&gt;</td>
<td>nothing or DP PP&lt;sub&gt;loc&lt;/sub&gt;</td>
<td>modifiers: without the complement,</td>
</tr>
<tr>
<td></td>
<td>DP PP&lt;sub&gt;on&lt;/sub&gt; or DP PP&lt;sub&gt;for&lt;/sub&gt;</td>
<td>DP PP&lt;sub&gt;on&lt;/sub&gt; or DP PP&lt;sub&gt;for&lt;/sub&gt;</td>
<td>the phrase is not complete; whereas</td>
</tr>
<tr>
<td><em>Sickness</em></td>
<td>nothing or PP&lt;sub&gt;with&lt;/sub&gt; PP&lt;sub&gt;about&lt;/sub&gt;</td>
<td>nothing or PP&lt;sub&gt;with&lt;/sub&gt; PP&lt;sub&gt;about&lt;/sub&gt;</td>
<td>modifiers are optional.</td>
</tr>
<tr>
<td><em>Conversation</em></td>
<td>PP&lt;sub&gt;from&lt;/sub&gt; or PP&lt;sub&gt;with&lt;/sub&gt; PP&lt;sub&gt;about&lt;/sub&gt;</td>
<td>PP&lt;sub&gt;from&lt;/sub&gt; or PP&lt;sub&gt;with&lt;/sub&gt; PP&lt;sub&gt;about&lt;/sub&gt;</td>
<td></td>
</tr>
</tbody>
</table>

*While this problem does not appear on this homework, you should know how to do this, since we covered complements in class.*

**Question 1. Structural ambiguity**

One of the following sentences has a structural ambiguity.

a. A girl saw a boy with a telescope  
b. The old man the bridge

- Provide complete labelled tree diagrams for both interpretations of the ambiguous sentence – **use the phrase structure rules linked from the schedule! (also at end of last handout)**
- Identify by paraphrasing which interpretation corresponds to which structure.  
  *Make sure that your paraphrases are not ambiguous and that they match the trees!*  
- For the sentence that is not ambiguous, draw the one appropriate tree, and  
- Explain what rules out interpretation as a different structure, using trees and rules to illustrate.

(a) is ambiguous, while (b) is not ambiguous. [YES, (b) is a grammatical sentence of English]

1. A girl saw a boy who had a telescope
2. A girl used a telescope to see a boy

The old man the bridge – initially seems ambiguous (and confusing!) – why?

Because we want to interpret the words “the old man” as the subject of the sentence (DP, where “old” is an adjective, and “man” is a noun), but then the next constituent should be the IP/VP, which should have an inflected verb or auxiliary as its head (no such verb is found), and should NOT begin with a determiner “the”!

So, we’re confused until we see the word “the” and then we reinterpret this sentence.

Thus, the confusion is created by the fact that “old” could be an adjective or a noun, and “man” could be a noun or a verb (similar “category” ambiguity is in the homework).

But the sentence is not ambiguous, because “the” can only be a determiner, and “bridge” can only be a noun (in our grammar).

This also illustrates a VERY IMPORTANT POINT about the proper treatment of PLURAL AND MASS NOUNS.

They are listed as “plural” in our lexicon. We need to keep track of which DPs and NPs contain plural/mass nouns, because different rules might apply to plurals vs. singulars, for example

Big cats run. => this is ok without a determiner
*Big cat runs. => this is ungrammatical without a determiner
One way to do it is to have a whole separate set of rules just for plurals. So, for instance, to get “Big cats run”, we’d need the rule NPplural → AdjP NPplural. This is bad, since it would almost double our little grammar with redundant rules saying the same thing twice for singular and plural nouns. So, we won’t do this.

Our solution: special principle for keeping track of “plural” feature:
keep passing the “plural” feature up the tree, until you use it in a rule, or until you don’t need it anymore.
At that point you can just erase the feature. This is what happens with “old” above, when NP -> NPplural

**Question 2. Constituency tests**

In the lecture we discussed a series of tests for constituency.

- Are the indicated word strings in the following sentences constituents? (answer yes or no)
- Use three for each word string:
  - substitution, movement, and question/stand-alone.
  - Provide all three test sentences for each word string (whenever using the stand-alone test, give the questions as well).

  a) [the tragedy] upset the entire family - to test if “the tragedy” is a constituent of this S:
     Sub: It upset the entire family
     Mov: What upset the entire family was the tragedy
     Stand-Alone: What upset the entire family? The tragedy!

     the tragedy [upset the entire family] - to test if “upset the entire family” is a constituent:
     Sub: The tragedy did it. The tragedy happened.
     Mov: What upset the entire family was the tragedy
     What the tragedy did was upset the entire family

     [...]I knew it was going to upset the entire family, and] upset the entire family, the tragedy did.

     SA: What did the tragedy do? Upset the entire family!

     FOR STAND-ALONE – always make sure to QUESTION the ORIGINAL SENTENCE

  b) The [computer was very] expensive
     Mov: *Computer was very, the expensive. *What computer was very, is the expensive
     SA: *What the expensive? What did the expensive? *Computer was very!

  c) We ate our lunch [near the river bank] yesterday.
     Sub: We ate our lunch there yesterday.
     Mov: Near the river bank, we ate our lunch yesterday.
     SA: Where did you eat your lunch yesterday? Near the river bank!

  d) Steve looked [up the number] in the book.
     Mov: *Up the number, Steve looked in the book.
     SA: What did Steve look in the book? Up the number!

NOTE: This is the kind of number up which I shall not look!
Look up is a constituent that cannot be broken-up! Up the number is not a constituent!
Churchill – This is the kind of nonsense up with which I shall not put!
Questions 3, 4. Comparative syntax

Question 3 in the homework asks you to compare Tshangla with the table of word-order correspondences discovered by Joseph Greenberg. The table is given in the Tom Payne reading (also below):

<table>
<thead>
<tr>
<th>Greenberg’s Universal</th>
<th>Parameter</th>
<th>V-O</th>
<th>O-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Main clauses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#3, 4</td>
<td>Adpositions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#2</td>
<td>Genitive (possessor) and head noun</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#17</td>
<td>Head noun &amp; adjective</td>
<td>N-Adj</td>
<td>Adj-N</td>
</tr>
<tr>
<td>#24</td>
<td>Relative clauses and head noun</td>
<td>N-RelCL</td>
<td>RelCL-N</td>
</tr>
<tr>
<td>#22</td>
<td>Comparatives</td>
<td>Adj-Mkr-Std</td>
<td>Std-Mkr-Adj</td>
</tr>
<tr>
<td>#16</td>
<td>Inflected auxiliaries</td>
<td>Aux-V V-Aux</td>
<td></td>
</tr>
<tr>
<td>#9</td>
<td>Question particles</td>
<td>Sentence-initial</td>
<td></td>
</tr>
<tr>
<td>#12</td>
<td>Question words</td>
<td>Sentence-initial or elsewhere</td>
<td>Sentence-initial</td>
</tr>
</tbody>
</table>

Table 7.1 Summary of Greenberg’s Universals (from appendix 2 of Greenberg 1963)

Look at the following Russian data, and

- Describe the various head and complement orders in the various syntactic constituents illustrated.
- In what respects do these data conform to Greenberg’s observations (see reading/table above), and in which they do not conform? Note any ambiguous or problematic data.

For Question 4 in the homework (Japanese), you’ll have to first figure out the break-down of the various morphemes, since there is no “second line” with morpheme-by-morpheme gloss, as below. To do that, just remember what you did with Turkish data. Reading what Tom Payne has to say about Japanese earlier in the chapter will also help.

- Write phrase structure rules and a lexicon that will generate these sentences of Russian.
- Give one more string/sentence that your lexicon and rules would allow, and one that would be ungrammatical according to the rules.

Constituent orders to pay attention to (from Payne reading): Verbs and Objects, Pre- or Post-positions, Possessor (genitive) and Possessed, adjectives and the nouns they modify, relative clauses and the nouns they modify, inflected auxiliaries and the verbs.

To answer the first question, just find these elements in the 10 sentences, and describe their order. Below each sentence I give order of relevant elements for that sentence. You don’t have to do this, just give me the generalisation based on all the sentences. But you have to look at sentences to figure out what the generalisation is. Word order in Russian below is V O, Pre-positions, Possessor precedes head noun, Head noun follows adjective.

To answer the second question, compare this with the table in Payne reading describing Greenberg’s generalisations – Russian is like the Greenberg VO languages in having VO, Prepositions, and Possessor preceding head noun. However, the nouns in Russian follow adjectives (like in English), so this goes against Greenberg’s generalisation.
1. My grandfather planted this big turnip.
   'My grandfather planted this big turnip'
   VERB (plant) precedes OBJECT (this big turnip)
   Possessor (my) precedes head noun (grandfather)
   Head noun (turnip) follows adjective (big)

2. Her house stood on that tall hill.
   'Her house stood on that tall hill'
   Adposition (on) precedes its complement DP (that high hill)
   Possessor (her) precedes head noun (house)
   Head noun (hill) follows adjective (high)

3. In the forest lived a wolf / 'A wolf was living in the forest'
   Adposition (in) precedes its complement DP (forest)

   'Mickey slept' / 'Mickey was sleeping'

5. A/The boy used to run in that beautiful park
   Adposition (in) precedes its complement DP (that beautiful park)
   Head noun (park) follows adjective (beautiful)

6. Mickey was eating a bun
   Verb (eat) precedes its complement DP (bun)

7. One boy was eating a/the big bun
   Verb (eat) precedes its complement DP (big bun)
   Head noun (bun) follows adjective (big)

8. Mickey bought a/the bun with raisins
   'Mickey bought a/the raisin bun'
   Verb (bought) precedes its complement DP (bun with raisins)
   Adposition (with) precedes its complement DP (raisins)

9. Mickey used to run with every dog
   Adposition (with) precedes its complement DP (every dog)

10. My grandfather gave a/the apple to Minnie
    Verb (gave) precedes both of its complement DPs (apple, Minnie)
    Possessor (my) precedes head noun (grandfather)
For Question 4, the first part, to write phrase structure rules and a lexicon, you need to draw trees for all the sentences.

- First, draw a “plausible” tree for the first sentence.
  - Assign grammatical categories that “make sense” in English (“apple” should be a noun, “this” should be a determiner, etc.).
  - If you’re not sure about the category of a word, put down a couple of options, and hope that subsequent sentences will help you figure it out.
- Once you have the tree, “read” the rules from the tree.
- Next, do the next sentence, making sure that the second tree follows the same rules that you wrote for the first.
  - If things don’t match up, change the rules so they fit both sentences at once.

By the time you’re halfway through the sentences, you should have a more or less complete grammar, and you’ll just need to add or tweak a few things to accommodate all 10 sentences.

Follow the general “phrase structure principles” we discussed in the lecture (all your rules should basically be either “specifier” rules or “complement” rules or “modifier” rules).

EXAMPLE: Here is how you would go about answering Question 4 for the Russian data above:
2. Here is a reasonable tree for (2):

```
S       VP
   /\      /\        P
  /  \    /  \       /\     \\
DP    VP   PP    DP    NP
     /\     /\      /\     \\
    /  \   /  \    /  \     \\
   Del NP  UP  P  NP  Adj
      /\  /\  /\     \\
     /  \ /  \ /  \     \\
    Del NP  Adj NP   Adj
      /\  /\     /\     \\
     /  \ /  \   /  \     \\
    Jejo N   Adj NP   holme
       /\     /\      \\
      /  \   /  \      \\
     Del house stojal na 
       /\     /\      \\
      /  \   /  \      \\
    Her  com on that
```

Rules so far (from (1) & (2))

```
S → DP VP
DP → D NP
NP → N
NP → Adj P NP
VP → V DP
VP → VP PP
VP → V Adj P
PP → P DP
```

Lexicon so far (from (1) & (2))

```
D → moj (my), etu (this), jejo (her), tom (that)
N → djeđ (grandfather), rdeček (turnip), dom (house), holme (hill)
V → posadili (planted), stojal (stood)
Adj → bol'shij (big), wysokom (high)
P → na (on)
```
3. This is not like English: ① subject (one wolf) follows predicate (lived in forest)
   ② PP modifier (in forest) precedes the VP
   ③ it modifies (lived)
   ④ forest appears with no determiner

This reflects observation ①

This reflects observation ②

This reflects observation ③

4. This one is like English:

This reflects observation ④

Rules for (1-4):

- S → DP VP
- S → VP DP
- DP → S NP
- NP → N
- NP → Adj P NP
- DP → NP
- DP → Npro

Lexicon for (1-4):

- S
- DP
- Npro
- Mickey
- VP
- V
- PP

N → dojč (g'pa), ričepku (turnip), dom (house), holmice (hill), volk (wolf), l'Esu (dog)
Npro → Ně:iki (Mickey)
V → posačil (planted), stojal (stood), zhil (lived), spal (slept)
Etc. - after repeating this for (1-10), we get the following grammar (this is the answer for this part):

**Rules:**

- $S \Rightarrow VP\ DP$
- $S \Rightarrow DP\ VP$
- $DP \Rightarrow D\ NP$
- $DP \Rightarrow Nproper$
- $DP \Rightarrow NP$
- $NP \Rightarrow N$
- $NP \Rightarrow AdjP\ NP$
- $NP \Rightarrow NP\ PP$
- $VP \Rightarrow Vtrans\ DP$
- $VP \Rightarrow Vintrans$
- $VP \Rightarrow Vditrans\ DP\ DP$
- $VP \Rightarrow VP\ PP$
- $VP \Rightarrow PP\ VP$
- $PP \Rightarrow P\ DP$
- $AdjP \Rightarrow Adj$
- $Lexicon$

**D**

- moj (my), etu (this), jejo (her), tom (that), odin (one), kazhdoj (every)

**N**

- d'ed (g'pa), r'epku (turnip), dom (house), holm'e (hil), volk (wolf), l'есu (forest), park'e (park),
  mal'chik (boy), bulku (bun), iz'umom (raisins), sobakoj (dog), jabloko (apple)

**Nproper**

- M'ilik'i (Mickey), M'mi (Minnie)

**Vintrans**

- stojal (stood), zhil (lived), spal (slept), b'egal (ran)

**Vtrans**

- posad'il (planted), jel (ate), kup'il (bought)

**Vditrans**

- dal (gave)

**Adj**

- bol'shuju (big), vysokom (high), kras'ivom (beautiful)

**P**

- na (on), v (in), s (with)

**Question 4, last part**, to give some grammatical and ungrammatical sentences, you DON'T need to KNOW Japanese (or Russian). Just answer according to what your little grammar rules tell you. (see below).

E.g. Using $S \Rightarrow VP\ DP$ rule, we can expand the VP using the $VP \Rightarrow Vtrans\ DP$, and eventually build

Kup'il jabloko odin d'ed

Bought apple one grandfather => 'One grandfather bought a/the apple'

For ungrammatical string (ungrammatical according to our little grammar), we can violate, e.g. $PP \Rightarrow P\ DP$

To avoid doing this, we need our rules to be able to keep track of which DP is the subject, and which one is the object, etc. But this is something that English rules that I gave in class don’t do, it’s making the rules more complex.

SO, it’s ok to ignore case information, and just have the rule $DP \Rightarrow Det\ N$, which will allow all 10 sentences, and also the ungrammatical sentence (11),

because your task is just to have the rules for the 10 sentences, rather than for the entire language, so it’s ok if the rules are not precise enough.