Homework Assignment 2: Lexical Analysis
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Due on Oct 4, 2004 by 1pm

1 Exercise 1: Relations and functions
Given the sets $C$ and $D$, compute the Cartesian product $C \times D$. Then, take the relations $R \subseteq C \times D$ and $S \subseteq C \times D$ and specify the inverse of $R$, $R^{-1}$, and the complement of $S$, $S'$. For each of these four relations, determine (i) whether it is a function or not, and, if it is, (ii) whether it is "into" or "onto" and (iii) whether it is many-to-one or one-to-one.

- $C = \{a, b, c, d, e\}$
- $D = \{1, 2, 3, 4\}$
- $C \times D = \emptyset$

- $R = \{<a, 1>, <b, 3>, <c, 2>, <e, 4>\}$
- $R^{-1} = \emptyset$

- $S = \{<a, 2>, <a, 3>, <a, 4>, <b, 1>, <b, 3>, <b, 4>, <c, 1>, <c, 2>, <c, 4>, <d, 1>, <d, 2>, <d, 4>, <e, 1>, <e, 2>, <e, 3>\}$
- $S' = \emptyset$

2 Exercise 2: The notion of grammaticality
Give two English-looking expressions that exemplify each of the following categories (obviously, the examples discussed in class do not count):

1. Descriptively ungrammatical sentences under any dialect of English.

2. Prescriptively ungrammatical sentences but descriptively grammatical for some dialect of English. (Do not use examples with double negatives, I instead of me and wanna.)

3. Grammatical sentences with semantic anomaly.

4. Grammatical sentences with processing difficulty. (Do not use Relative Clauses to create the processing difficulty.)

3 Exercise 3: Palauan
4 Exercise 4: Swahili

Examine the following data from Swahili, a language spoken in East Africa, and answer the questions that follow.

i. Give the Swahili morphemes for the following English translations:
   
   I  
   you (subject)  
   s/he  
   we  
   they  
   future marker  
   past marker  

   me  
   you (object)  
   him/her  
   us  
   them  
   present perfect marker  
   present progressive marker

ii. What is the order of the morphemes in Swahili, in terms of subject, object, verb and tense?

iii. Give the Swahili word for the following English translations:
   
   I have beaten them.  
   They are beating me.  
   They have annoyed me.  
   You have beaten us.  
   We beat them.  
   I am paying him/her.

iv. Give the English translations of the following Swahili words:
   
   [atanilipa]  
   [utawapiga]  
   [walikupenda]  
   [nimensumbua]