Homework Assignment 9, optional
Ling 106, Maribel Romero
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Due on Dec 10 by 1pm at the Linguistics office

1 Exercise 1

Simplify the following set-theoretical expression as much as possible, using exclusively the equalities in Partee et al. page 18.

\((A - B) \cup (A \cap B)\)

2 Exercise 2

Lexikon: separating the units.

3 Exercise 3

Design a deterministic FSA that recognizes each of the following languages:
   a) \(\{w: \text{each } 0 \text{ in } w \text{ is immediately followed by the substring } 11\}\)
   b) \(\{w: w \text{ contains the substring } 01 \text{ but not the substring } 100\}\). E.g. the string 1001 does not belong to this language.

4 Exercise 4

Take non-deterministic finite state automaton given below. Construct an equivalent deterministic finite state automaton that accepts the same language, using the proof we learned in class for Theorem 1.19. That is, apply the algorithm for converting any NFA to an equivalent DFA, and provide the full-fledged description \((Q', \Sigma, \delta', q_0', F')\) and the simplified diagram of the resulting deterministic FSA. Assume that the alphabet is \(\{0, 1\}\).
5 Exercise 5

Show that the following language is not regular by using the Pumping Lemma (reasoning abstractly about $p$).

a) $A = 1^n010^m$, where $n = 1/2m$.

6 Exercise 6

The following sentence is in principle (and using some imagination) several way ambiguous: what is large can be the tables, the office, or the home. Describe each reading in your own words (unambiguously), design a (miniature) Context Free Grammar that will generate the corresponding tree for each reading, and draw the tree for each reading.

Large home office tables are available.