Fundamentals of Computer Science, Spring 2014

Assignment 1

Due date: February 3, 2014

Mandatory exercises

1) Let $\Sigma = \{a, b\}$. Let L be the language of all words over Σ that have an even number of occurances of the symbol a. Show that L is a regular language by constructing a DFA that accepts L. Argue that no DFA that accepts L can have fewer states than the one you have defined.

2) Construct a regular expression that defines that language L from exercise **1**.

Voluntary exercises (for higher grades than 3)

3) Define a language L such that the there is an NFA that accepts L that has fewer states than the minimal DFA that accepts L. To show that this is the case, construct the minimal DFA that accepts L and argue that it is indeed minimal by showing that none of its states are indistinguishable. Also construct an NFA for L that has fewer states than the DFA and argue that it indeed accepts exactly L.