

Group: _____

Assignment 1

Name: _____

Formal Models

Matr.Nr.: _____

Summer Semester 2010

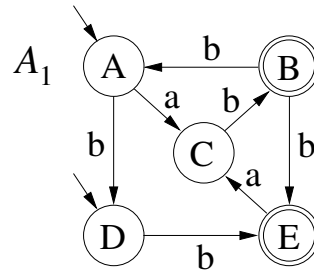
Points: _____

Due: 11.03.2010 08:30

Institute for Formal Models and Verification, Dr. Robert Brummayer, Dipl.-Ing. Florian Lonsing

Exercise 1

Given the finite automaton (FA) A_1 as shown on the right. Specify A_1 formally as a 5-tuple, including all of its components. Is $\epsilon \in L(A_1)$, $abb \in L(A_1)$ and $baa \in L(A_1)$? Justify your answers.

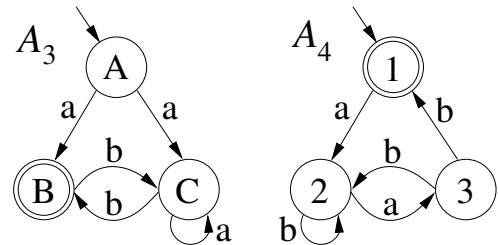


Exercise 2

Construct an FA $A_2 := (S_2, I_2, \Sigma_2, T_2, F_2)$ with $\Sigma_2 := \{a\}$ such that $L(A_2)$ exactly contains all words w over Σ_2 such that the length of w is a multiple of 3. Draw A_2 and specify it formally as a 5-tuple.

Exercise 3

Let $P_3 := A_3 \times A_4$ be the product automaton of FA A_3 and FA A_4 as shown on the right. Draw P_3 and fully specify it formally as a 5-tuple. Find three words w with $w \in L(P_3)$. What is the maximum number of states P_3 can have in theory? Justify your answers.



Exercise 4

Let A and B be two arbitrary FA and $P := A \times B$. Explain in your own words why the following proposition is true:

$$w \in L(P) \text{ if and only if } w \in L(A) \text{ and } w \in L(B).$$