Formal Models SS 2016: Assignment 2

Institute for Formal Models and Verification, JKU Linz

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Exercise 5

Let A_1 be an *arbitrary* FA and $\mathbb{P}(A_1) := (S, I, \Sigma, T, F)$ be the power automaton of A_1. Describe in your own words the formal definition of $\mathbb{P}(A_1)$, including all of its components. What are the basic properties of a power automaton? Is the following proposition true? Justify your answer.

$$|S' \xrightarrow{a}| = 1 \text{ for all } S' \in S \text{ and for all } a \in \Sigma.$$

Exercise 6

Given A with states $S = \{A, B, C, D\}$, alphabet $\Sigma = \{a, b\}$, initial/final states $I = \{A, C\}$, $F = \{B\}$, and transitions $T = \{(A, b, A), (A, a, B), (B, b, D), (C, a, A), (C, a, C), (C, b, D), (D, b, C)\}$,

Draw the power automaton $\mathbb{P}(\mathsf{A})$ for FA A. What is the maximum number of states $\mathbb{P}(\mathsf{A})$ can have in theory? Justify your answer.

Exercise 7

Draw the automaton K, which describes exactly the complement language described by the automaton of Exercise 6.

Exercise 8

Draw a *deterministic* FA A with $\Sigma := \{a, b\}$ having *at least* 3 states such that $L(C(A)) \neq \overline{L(A)}$, where $C(A)$ denotes the complement-automaton of A. Explain your solution.