Technische Universität München **Winter term 2013/2014**
I7
M. Kufleitner / A. Durand-Gasselin **5.12.2013**

Automata and Formal Languages – Exercise sheet 5

Exercise 5.1

Let $n \geq 1$. Give two inequivalent deterministic $\{a, b\}^*$-automata $\mathcal{A}_i = (Q_i, \cdot, q_{0i}, F_i)$ for $i \in \{1, 2\}$ with at least n states such that the shortest word in $\big(L(\mathcal{A}_1) \setminus L(\mathcal{A}_2)\big) \cup \big(L(\mathcal{A}_1) \setminus L(\mathcal{A}_2)\big)$ has length at least $1 + \max(|Q_1|, |Q_2|)$.

Exercise 5.2

Give an algorithm which for a given deterministic Σ^*-automaton $\mathcal{A}$ decides whether $L(\mathcal{A})$ is infinite, and which, in case that $L(\mathcal{A})$ is finite, computes $|L(\mathcal{A})|$.

Exercise 5.3

Give an algorithm which computes for a given word $u \in \Sigma^*$ the number of scattered subwords of u. For instance, aaa has the 4 scattered subwords, namely ε, a, aa, aaa, whereas aab has 6 scattered subwords, namely $\varepsilon, a, b, aa, ab, aab$.