

CSE625: Introduction to Formal Languages – Homework 3

Due: April 24, 2009 (Fri) in class. No late homework is accepted.

Note: The TA might only grade a subset of the homeworks.

Problem 1: [20 pts] Exercise 4.10 (b), (c), (d), and (f). Don't simplify your resulting deterministic FAs.

Problem 2: [12 pts] Consider the NFA in Exercise 4.10 (d) of the textbook. Let L be the language accepted by this NFA, and δ its transition function.

- (2.1) What is $\delta^*(1, abaaa)$? Is the string $x = abaaa$ accepted by this NFA? Now take the corresponding deterministic FA you constructed in problem 1, and suppose μ is the transition function of this FA. What is $\mu^*(1, abaaa)$? Is the string $x = abaaa$ accepted by this FA?
- (2.2) Draw a deterministic FA that accepts the language \bar{L} . (Recall $\bar{L} = \{x \in \{a, b\}^* \mid x \notin L\}$ is the complement of L .)
- (2.3) Let L_2 be the language accepted by the NFA in Exercise 4.10 (b) of the textbook. Construct a deterministic FA that accepts the language $L_2 \cap \bar{L}$. (Hint: use the corresponding deterministic FA you constructed for this NFA in Problem 1, and the FA you constructed in (2.2).)

Problem 3: [9 pts] Problem 4.15 in the textbook.