

CSE 311: Foundations of Computing I
Assignment #8
May 23, 2012
due: Wednesday, May 30, 1:30 p.m.

Textbook numbering labeled “6th edition” refers to the textbook’s Sixth Edition.
Numbering that is unlabeled refers to the Seventh Edition.

In all the textbook exercises, the phrase “deterministic finite-state automaton” means an ordinary finite-state automaton as we’ve been using that name in lecture.

1. Let $M = (S, I, f, s_0, F)$ be a finite-state automaton, let $s \in S$, $x \in I^*$, and $y \in I^*$.
Prove that

$$f(s, xy) = f(f(s, x), y)$$

by induction on $|y|$, the length of the string y .

2. Section 13.3 [6th edition: Section 12.3], exercise 16. Express your answer as a regular expression.
3. Section 13.3 [6th edition: Section 12.3], exercise 24.
4. Section 13.3 [6th edition: Section 12.3], exercise 42.
5. Section 13.4 [6th edition: Section 12.4], exercise 6, parts c and d. Part c is to be interpreted as, “... every 1 followed by at least two 0s”. In addition to what the exercise asks, also give a finite-state automaton for the set in part c.