

CSE 322: Introduction to Formal Models in Computer Science
Assignment #3
October 18, 2006
due: Wednesday, October 25

1. Exercise 1.18(g) [1st Ed: Exercise 1.13(g)]. Solve this problem using only 4 concatenation operators.
2. Exercise 1.18(j) [1st Ed: Exercise 1.13(j)].
3. Exercise 1.15 [1st Ed: Exercise 1.11]. As part of your counterexample you must supply a string that proves that $L(N) \neq (L(N_1))^*$.
4. Use the procedure described in Lemma 1.55 [1st Ed: Lemma 1.29] to convert the regular expression

$$((\varepsilon \cup 1) \cup 00^*1)^*$$

into the state diagram of an NFA. Do not skip steps or simplify your automaton. That is, everyone who follows the procedure correctly should come up with the exact same diagram.

5. (a) Use the procedure described in Lemma 1.55 [1st Ed: Lemma 1.29] to convert the regular expression

$$\phi^*$$

into the state diagram of an NFA. Do not skip steps or simplify your automaton. That is, everyone who follows the procedure correctly should come up with the exact same diagram.

- (b) What is the language represented by ϕ^* ? (Hint: study your answer to part (a).)
6. Use the procedure described in Lemma 1.60 [1st Ed: Lemma 1.32] to convert the NFA of Figure 1.36 [1st Ed: Figure 1.20] on page 53 to an equivalent regular expression. Eliminate the states in the order q_3, q_2, q_1 . Do not skip steps or simplify your regular expressions. That is, everyone who follows the procedure correctly should come up with the exact same regular expression.