

CSE 322 Spring 2005

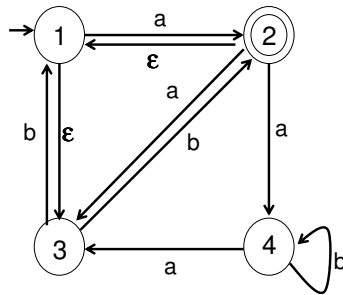
Assignment #3

Due: Friday, April 22, 2005

Reading assignment: Read section 1.4 of Sipser's book.

Problems:

1. Apply the subset construction to convert the following NFA to a DFA. Only the states reachable from the start state need to be shown.



2. Using the construction given by the proof of Lemma 1.29 (as shown in Examples 1.30 and 1.31) to draw state diagrams for NFAs that accept the languages given by the following regular expressions. Include all states that would be created by this construction.
 - (a) $((ab)^*b)^* \cup bb^*$
 - (b) $(a^*b(a^*b)^*b^*)^*$
 - (c) $(a \cup ab)^* \cup (b \cup ba)^*$
3. Use the construction given on the handout to build a regular expression for the language accepted by the DFA M_2 in question 1.1 page 83 of Sipser's text. Show your steps.
4. Use the method given in class to design a linear time algorithm to determine whether or not the string $ababbababaa$ is contained in strings over the alphabet $\{a, b\}$.
5. Sipser's book page 89, Problem 1.32.
6. Sipser's book page 90, Problem 1.41.
7. (Bonus) Show that if L is recognized by a finite automaton then there is a finite automaton that recognizes the set of first halves of strings in L ,

$$L_{\frac{1}{2}} = \{x : xy \in L \text{ for some } y \text{ with } |x| = |y|\}.$$