

CSE 322 Spring 2005

Assignment #1

Due: Friday, April 8, 2005

Reading assignment: Read Sipser's book, sections 1.1 and 1.2; you should already have read Chapter 0.

Problems:

1. We have only informally defined the reversal w^R of a string w . Formally, we can give the following inductive definition:

Base case If $w = \epsilon$ then $w^R = \epsilon$.

Inductive step If $w = va$ for $v \in \Sigma^*$ and $a \in \Sigma$ then $w^R = av^R$.

Prove by induction on the number of characters in y that for all strings $x, y \in \Sigma^*$,
 $(xy)^R = y^R x^R$.

2. Sipser's book page 84, Exercise 1.3
3. For Example 1.4 in the text, write out the sequence of states that machine M_4 goes through in computing on input string *abaabba* and for input string *bbaaba*. Which of these strings is accepted by M_4 ?
4. Sipser's book page 84, Exercise 1.4. Parts (b), (c), (d), (e), (f), (j), (l). As documentation for your DFAs, for each state write a very brief description of the set of strings that reach that state.
5. Do the same as Exercise 1.4 Part (d), but do it for those strings that have a 0 in the third from last position rather than in the third position. As documentation for your DFA, for each state write a very brief description of the set of strings that reach that state.