

Formal methods, Fall 2008
Problem set 5 – regular languages
Assigned: 11/4, Due: 11/15

1 Finite languages

Give a proof that any finite language is regular.

2 Exercises

- [a] Construct a DFA that recognizes $\{w \mid \text{every odd position of } w \text{ is a } 1\}$.
- [b] Do PMW ch. 17 problem 4. For part (c), also give the formal description of the machine, using the representation developed in class (that is, the representation from the Sipser textbook).
- [c] Do PMW ch. 17 problem 11 (a-c) and (e).
- [d] Show that the following language is not regular: $\{0^n 1^m 0^n \mid m, n \geq 0\}$.
- [e] Show that the following language (surprisingly) is regular:
 $\{w \mid w \text{ has an equal number of occurrences of } 01 \text{ and } 10 \text{ as substrings}\}$.
(Note, the substrings you are counting may overlap, so 010 counts as one of each, and 1010 counts as two 10s and one 01.)
- [e] (grads only) show that the following language is not regular: $\{w \mid w \in \{0, 1\}^* \text{ is not a palindrome}\}$.