

Homework 2 – Due: Friday, February 4, 2005

Prof. Nadeem Abdul Hamid
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1

Typeset only the statements of problems (1.23), (1.24), and (1.25) in the Sipser textbook using L^AT_EX. You do not have to solve the problems – just reproduce the statements of the problems as closely as possible. Upload your L^AT_EXsource file to the Vikingweb.

2

Solve Exercise 1.3 in Sipser: The formal description of a DFA (deterministic finite automaton) M is $(\{q_1, q_2, q_3, q_4, q_5\}, \{u, d\}, \delta, q_3, \{q_3\})$, where δ is given by the following table. Give the state diagram of the machine.

	u	d
q_1	q_1	q_2
q_2	q_1	q_3
q_3	q_2	q_4
q_4	q_3	q_5
q_5	q_4	q_5

3

Solve Exercise 1.4, parts (c), (h), (j), (k), and (l).

Give state diagrams of DFAs recognizing the following languages. In all cases the alphabet is $\{0, 1\}$.

- $\{w \mid w \text{ contains the substring } 0101, \text{ i.e., } w = x0101y \text{ for some } x \text{ and } y\}$.
- $\{w \mid w \text{ is any string except } 11 \text{ and } 111\}$.
- $\{w \mid w \text{ contains at least two } 0\text{s and at most one } 1\}$.
- $\{\epsilon, 0\}$.
- $\{w \mid w \text{ contains an even number of } 0\text{s, or exactly two } 1\text{s}\}$.