

Problem Set 5 — Due February 7, 2002

Problem 1. (Postponed from last time)

Part A. Show that there is an $(n + 2)$ -state NFA for $L_n = (\Sigma^*)0\Sigma^n$. (Take $\Sigma = \{0, 1\}$.)

Part B. Prove that any DFA for L_n requires at least 2^n states.

Problem 2. Page 86, Exercise 1.17, parts b and c.

Problem 3. Page 88, Problem 1.23, parts a and d.

Problem 4. Page 90, Problem 1.41.

Problem 5. Give a decision procedure for the following language:

$L = \{\langle \alpha \rangle : \alpha \text{ is a shortest regular expression whose language is } L(\alpha)\}.$