Automata and Formal Languages

Homework Set 4

October 15, 2002

http://staffweb.ncnu.edu.tw/shieng

Due date: Oct. 22

Problem 1

Give NFAs with the specified number of states recognizing each of the following languages. In all cases the alphabet is $\{0, 1\}$.

1. The language $\{\epsilon\}$ with one state.
2. The language 0^* with one state.
3. The language $0^*1^*0^*0$ with three states.

Problem 2

Do Exercise 1.6 (a) in the textbook.

Problem 3

Do Exercise 1.12 (b) in the textbook.

Problem 4

Do Exercise 1.16 (b) in the textbook.

Problem 5

Let R_1, R_2, R_3, and R_4 be any regular expressions. Prove the following properties, where equality '=' indicates that expressions on both sides represent the same language:

1. $R \cup \emptyset = R$;
2. $R \circ \epsilon = R$;
3. $(R_1 \cup R_2) \circ R_3 = (R_1 \circ R_3) \cup (R_2 \circ R_3)$;
4. $R_3 \circ (R_2 \cup R_1) = (R_3 \circ R_2) \cup (R_3 \circ R_1)$;
5. $(R_1^*)^* = R_1^*$.