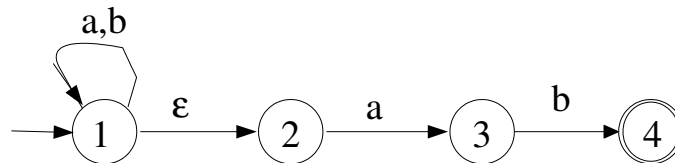


Seminar 1

You are expected to present solutions to these problems at the seminar in week 1.

- 1 Write a regular expression describing the language of all binary numbers without unnecessary initial zeros.
- 2 Write a regular expression describing the language of all arithmetic expressions with binary numbers and the operators + and *, but without parentheses. Give some examples of expressions in the language.
- 3 Write a regular expression describing the language of all binary strings that
 - a. contain the string 11.
 - b. do not contain the string 11.
- 4 Construct
 - a. an NFA that accepts all binary strings that contain the string 11. The automaton should not be deterministic.
 - b. a DFA that accepts all binary strings that contain the string 11.
- 5 Construct a DFA that accepts the same language as the following NFA using simulation. Mark each state in the new automaton with the corresponding state numbers of the NFA.



- 6 Construct a DFA that accepts all binary strings that do not contain the string 11.
- 7 Construct a combined DFA recognizing binary integers and binary floating point numbers described by $(0|1)^+$ and $(0|1)^+.(0|1)^+$. Make tables for a table driven scanner.
- 8 Suppose that the following automaton describes a lexical analyzer that always tries to do a longest match. How many characters past the end of a token might it have to examine before matching the token? Give an example where this lookahead is required.

