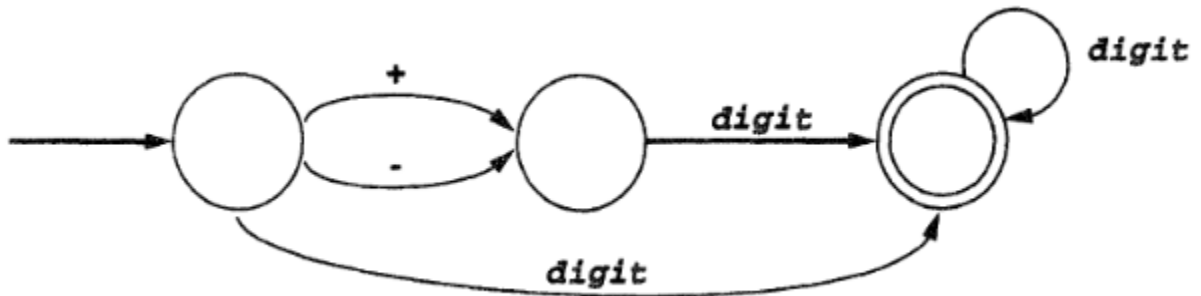


Homework Assignment 1

Exercise 1

Give the regular expression of the following automata



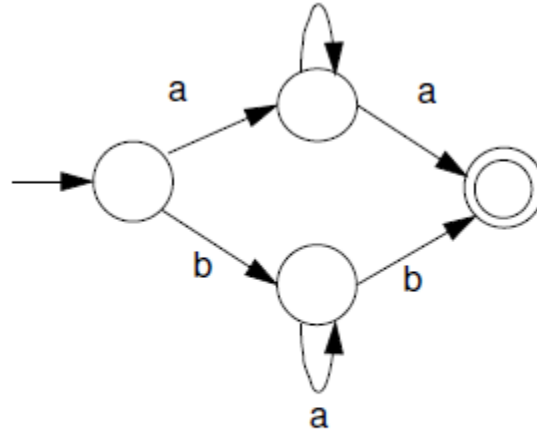
Exercise 2

For the regular expression $(a|b)^*bac(a|bc)^*$ over the alphabet $\Sigma = \{a, b, c\}$ construct:

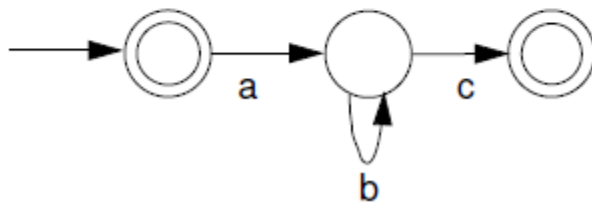
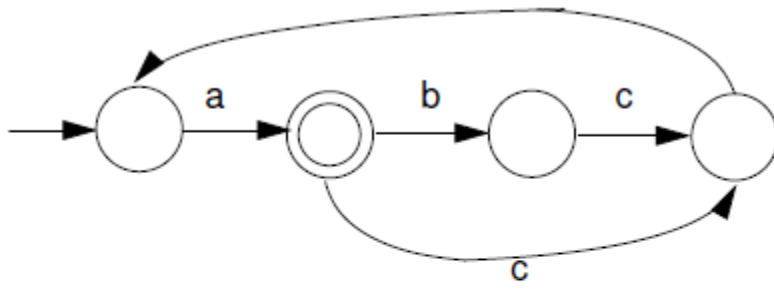
- a nondeterministic finite automaton,
- a deterministic finite automaton, and
- a minimal deterministic finite automaton

Exercise 3

Write regular expressions that define the strings recognized by the FAs in the following figures



d



Exercise 4

Given the grammar

$$\begin{aligned} \text{exp} &\rightarrow \text{exp addop term} \mid \text{term} \\ \text{addop} &\rightarrow + \mid - \\ \text{term} &\rightarrow \text{term mulop factor} \mid \text{factor} \\ \text{mulop} &\rightarrow * \\ \text{factor} &\rightarrow (\text{exp}) \mid \mathbf{number} \end{aligned}$$

write down leftmost derivations, parse trees for the following expressions:

a. $3+4*5-6$

b. $3*(4-5+6)$

c. $3-(4+5*6)$

Exercise 5

Given the following grammar

$$\begin{aligned} \text{statement} &\rightarrow \text{if-stmt} \mid \mathbf{other} \mid \varepsilon \\ \text{if-stmt} &\rightarrow \mathbf{if} (\text{exp}) \text{statement} \text{else-part} \\ \text{else-part} &\rightarrow \mathbf{else} \text{statement} \mid \varepsilon \\ \text{exp} &\rightarrow \mathbf{0} \mid \mathbf{1} \end{aligned}$$

a. Draw a parse tree for the string

if(0) if(1) other else else other

b. What is the purpose of the two **else**'s?

c. Is similar code permissible in C? Explain.