第五次课后作业参考答案

April 3rd, 2019

必做题

1

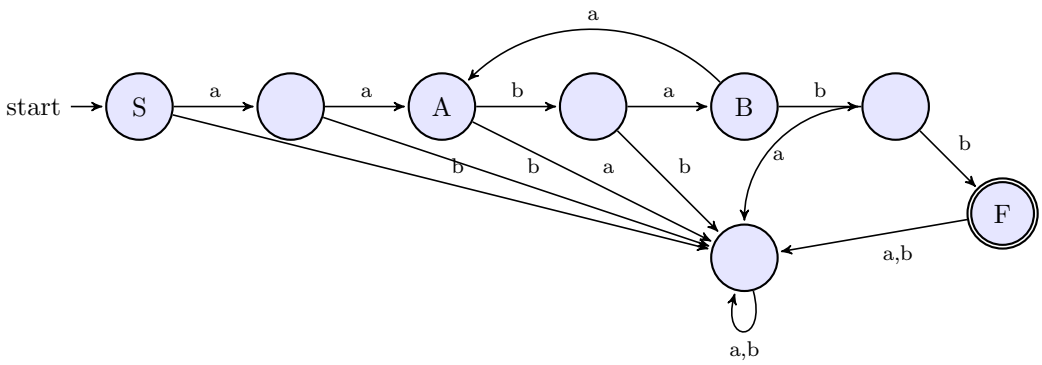
Construct a DFA that accepts the language generated by the grammar

$$S \to aaA, A \to baB, B \to aA|bb$$

For this language construct a left-linear grammar, too.

解答：

DFA:



Left-linear grammar:

$$\begin{aligned} Z &\to Bbb \\ B &\to Aba \\ A &\to Ba|aa|Saa \\ S &\to \varepsilon \end{aligned}$$

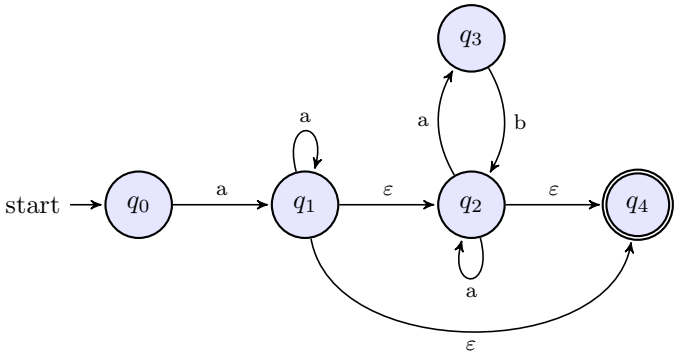
2

Find a regular grammar that generates the language

$$L(aa^*(ab+a)^*)$$

解答：

(a) Constructer a NFA:



(b) Using S for q_0, A for q_1, B for q_2, C for q_3, a right-linear grammar is:

$$\begin{aligned} S &\rightarrow aA \\ A &\rightarrow aA|B|\varepsilon \\ B &\rightarrow aB|aC|\varepsilon \\ C &\rightarrow bB \end{aligned}$$

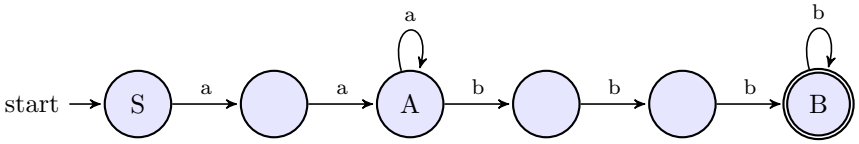
3

Construct a right- and left-linear grammar for the language:

$$L = \{a^n b^m : n \geq 2, m \geq 3\}$$

解答：

(a) Constructer a NFA:



(b) Right-linear grammar:

$$\begin{aligned} S &\rightarrow aaA \\ A &\rightarrow aA|bbbB \\ B &\rightarrow bB|\varepsilon \end{aligned}$$

(c) Left-linear grammar:

$$\begin{aligned} Z &\rightarrow B \\ A &\rightarrow Aa|aa \\ B &\rightarrow Bb|Abbb \end{aligned}$$

4

L_1 and L_2 are regular languages. Using regular grammar to prove that:

1. $L_1 \cup L_2$ is also a regular language.
2. $L_1 L_2$ is also a regular language.

证明：
（略）