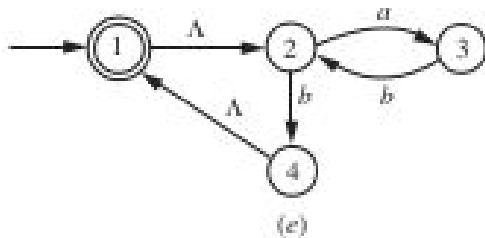
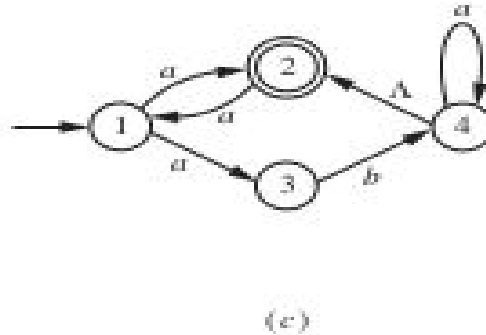
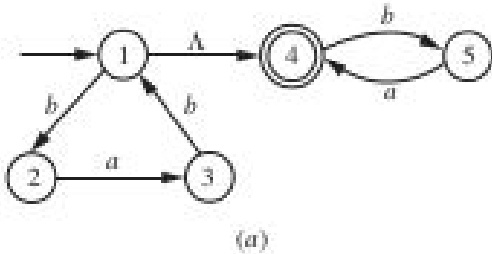


Third assignment of introduction to theory of computation

Mojtaba Mojtahedi

1. For each NFA pictured below draw an NFA with no Λ -transitions accepting the same language.



2. For each of the following regular expressions, draw an NFA accepting the corresponding language, so that there is a recognizable correspondence between the regular expression and the transition diagram.

a. $(b + bba)^*a$

c. $(a + b)(ab)^*(abb)^*$

e. $(a^*bb)^* + bba^*$

3. Suppose Σ_1 and Σ_2 are alphabets, and the function $f : \Sigma_1^* \rightarrow \Sigma_2^*$ is a homomorphism; i.e., $f(xy) = f(x)f(y)$ for every $x, y \in \Sigma_1^*$

a. Show that $f(\Lambda) = \Lambda$

b. Show that if $L \subseteq \Sigma_1^*$ is regular, then $f(L)$ is regular. ($f(L)$ is the set $\{y \in \Sigma_2^* \mid y = f(x) \text{ for some } x \in L\}$.)

c. Show that if $L \subseteq \Sigma_2^*$ is regular, then $f^{-1}(L)$ is regular. ($f^{-1}(L)$ is the set $\{x \in \Sigma_1^* \mid f(x) \in L\}$.)

4. Figure 3.39 shows FAs M_1 and M_2 accepting languages L_1 and L_2 , respectively. Draw NFAs accepting each of the following languages.

- a. $L_2^* \cup L_1$
- b. $L_2 L_1^*$
- c. $L_1 L_2 \cup (L_2 L_1)^*$

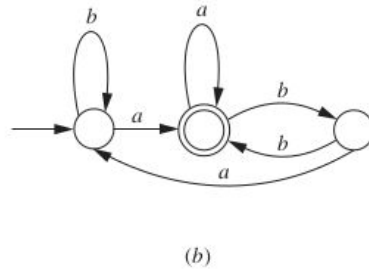
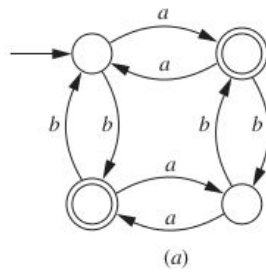


Figure 3.39 |