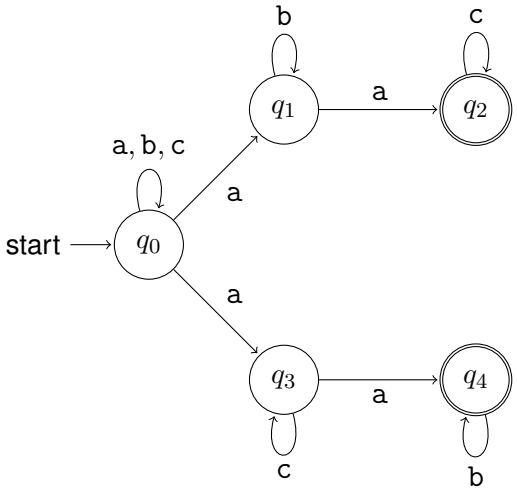
CPSC 351 — Tutorial Exercise #3
Additional Practice Problems

About These Problems

These problems will not be discussed during the tutorial, and solutions for these problems will not be made available. They can be used as "practice" problems that can help you practice skills considered in the lecture presentation for Lecture #3, or in Tutorial Exercise #3.

Practice Problems

1. Let $\Sigma = \{\mathtt{a}, \mathtt{b}, \mathtt{c}\}$ and let $M = (Q, \Sigma, \delta, q_0, F)$ be the following nondeterministic finite automaton.



   (a) State $Cl_\lambda(q)$, as precisely as you can, for every state $q \in Q$.

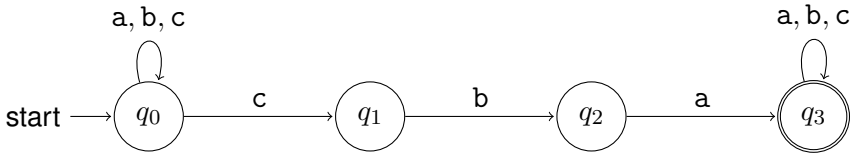
   (b) Describe the set

$$S_q = \{\omega \in \Sigma^\star \mid q \in \delta^\star(q_0, \omega)\}$$

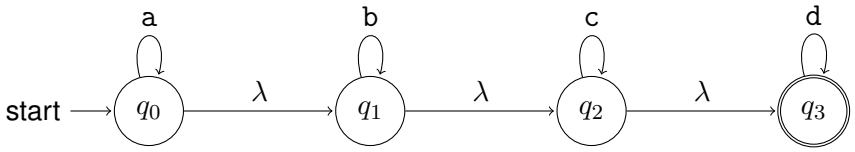
as precisely as you can, for every state $q \in Q$ — and describe a way to prove that your answer is correct — or, if you have the time and need more practice, write the proof!

(c) Use the information that you have given, above, to describe the language, $L(M)$, of this deterministic finite automaton, M, as precisely as you can.

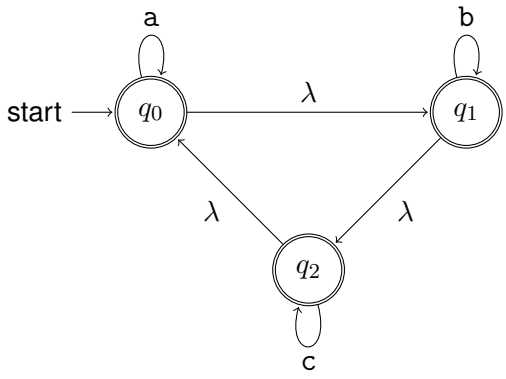
2. Repeat Question #1, where $\Sigma = \{\mathtt{a}, \mathtt{b}, \mathtt{c}\}$ and $M = (Q, \Sigma, \delta, q_0, F)$ is the following nondeterministic finite automaton.



3. Repeat Question #1, where $\Sigma = \{\mathtt{a}, \mathtt{b}, \mathtt{c}, \mathtt{d}\}$ and $M = (Q, \Sigma, \delta, q_0, F)$ is the following nondeterministic finite automaton.



4. Repeat Question #1, where $\Sigma = \{\mathtt{a}, \mathtt{b}, \mathtt{c}\}$ and $M = (Q, \Sigma, \delta, q_0, F)$ is the following nondeterministic finite automaton.



5. Design design deterministic finite automata with the same languages as those of the nondeterministic finite automata that are given in Questions #1–#4, above.