CS361, Fall 1995

Instructor: Dr. Guo-Qiang Zhang

Lecture Notes of Monday, 10/9/95

Topic: Powerset Construction

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1 Kleene's Theorem

Kleene's Theorem states that a language is regular **if and only if** it is accepted by some DFA.

Powerset construction is for one part of it. We give two more examples to illustrate the convertion from an NFA to a DFA.

The two important key steps are,

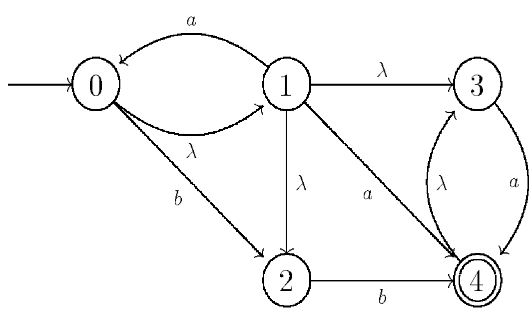
1. Find out $B := \delta(A, a)$;

2. Find out $\Lambda(B)$.

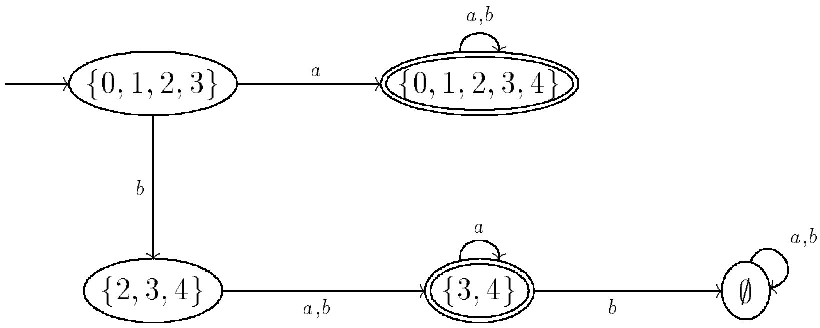
Here, A, B are subsets of states. $\Lambda(B)$ is the collection of all the states that can be reached from B via λ moves only. We call such moves "secrete passages".

2 Example 1

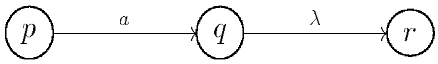
Consider the following NFA:



The equivalent DFA of the above NFA is:

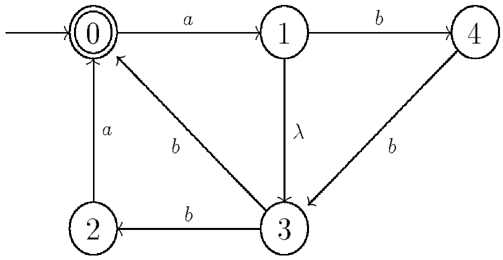


There are two basic steps to remember about the powerset construction. In the following figure, for example, we have $\delta(p,a) = \{q\}$, and $\Lambda(\delta(p,a)) = \{q,r\}$.



3 Example 2

Consider the following NFA



The equivalent DFA of the above NFA is: