Theory of Computation, CSCI 438 spring 2022
Relation between NFAs and DFAs, pg. 54-63, Jan. 24

Exercise 1.9a, 1.10a, b & c, and 1.16 a & b

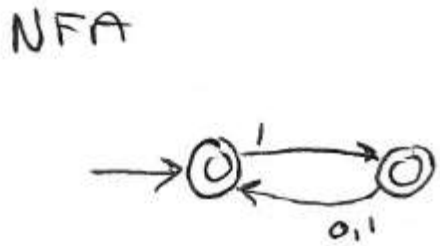
1.9a Use the construction in the proof of Theorem 1.47 to give the state diagrams of NFAs recognizing the concatenation of the languages described in Exercises 1.6g and 1.6i.

The languages of 1.6 are on the alphabet {0, 1}.

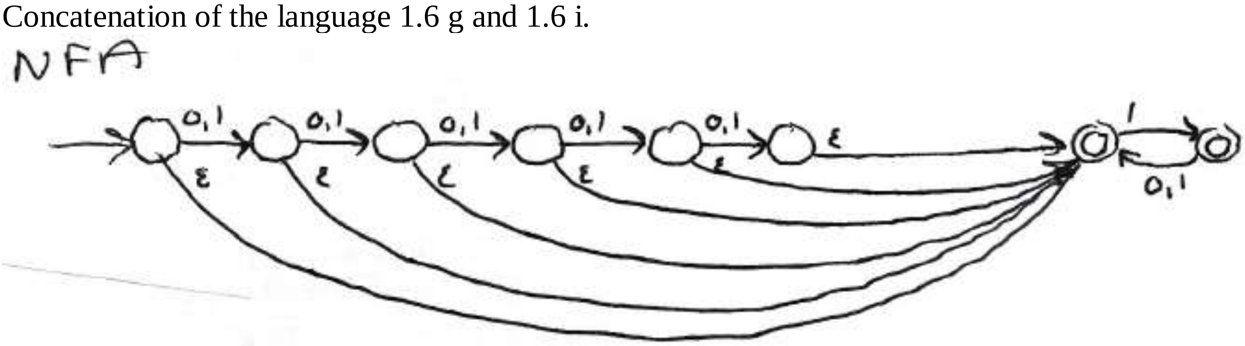
1.6 g {w | the length of w is at most 5}
1.6 i {w | every odd position of w is a 1}

1.6 g:

1.6 i



Concatenation of the language 1.6 g and 1.6 i.



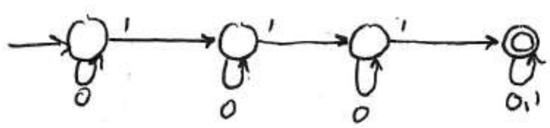
1.10 Use the construction in the proof of Theorem 1.49 to give the state diagrams of NFAs recognizing the star of the languages described in Exercise 1.6 j.

The languages of 1.6 are on the alphabet {0, 1}.

a. Exercise 1.6b

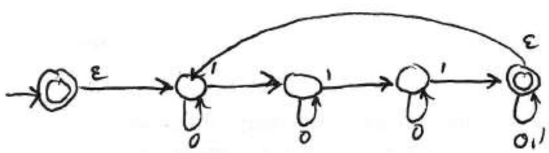
1.6 b {w | w contains at least three 1s}

NFA



Star of the language 1.6 b.

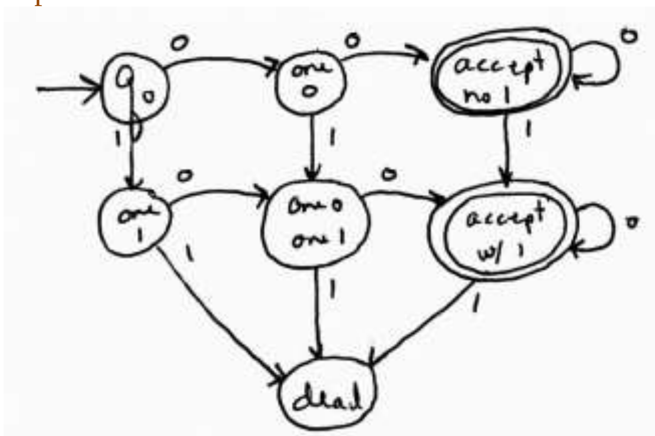
NFA



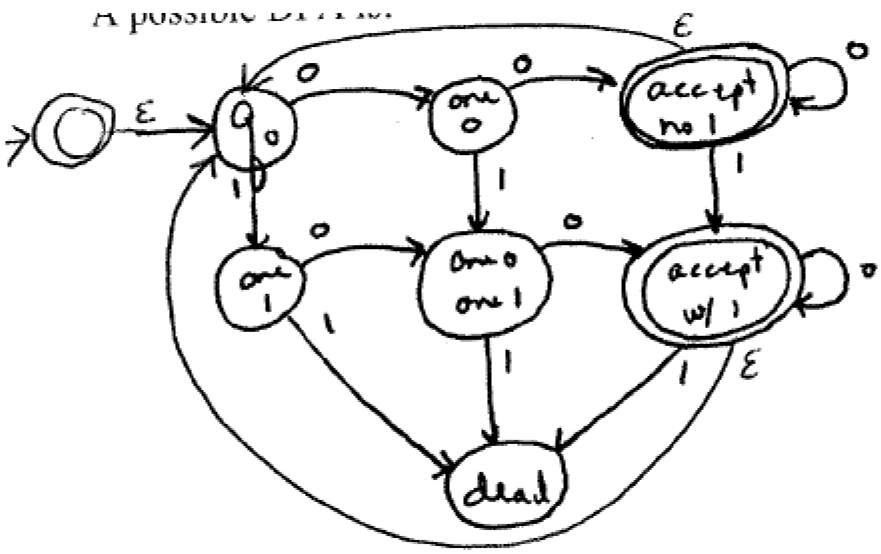
b. Exercise 1.6j

1.6 j. {w | w contains at least two 0s and at most one 1}

A possible DFA is:



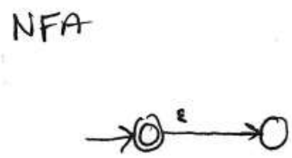
Using the construction of Theorem 1.49, to create the Kleene closure of the language, {w | w contains at least two 0s and at most one 1}*.



c.Exercise 1.6m

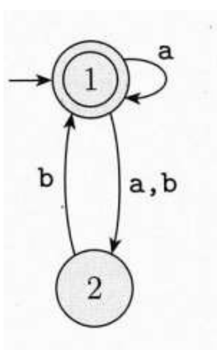
1.6 m The empty set

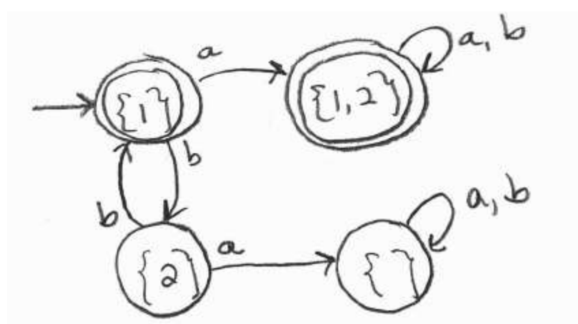
Star of the language 1.6 m.



1.16 Use the construction given in Theorem 1.39 to convert the following two nondeterministic finite automata to equivalent deterministic finite automata.

a.





b.