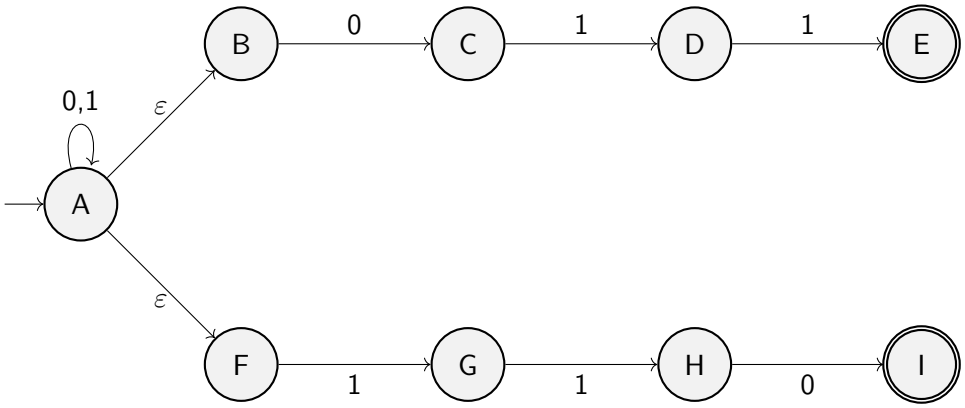
CSE 390Z: Mathematics of Computing

Week 9 Workshop Solutions

0. NFAs 1

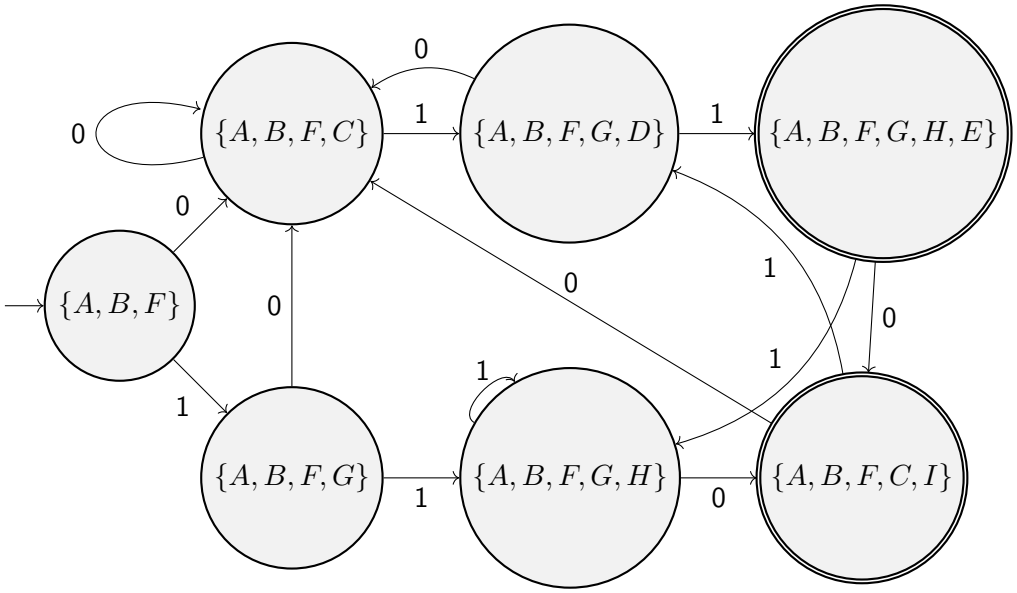
(a) Construct an NFA for the language "all binary strings ending in either 011 or 110".

Solution:



(b) Construct an equivalent DFA for the same language.

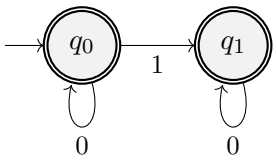
Solution:



1. NFAs 2

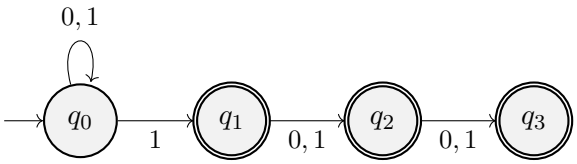
(a) Construct an NFA for the language "all strings from the alphabet $\Sigma = \{0, 1, 2\}$ containing only 0's and 1's, and at most one 1".
For instance, the strings 0000, 0010, 1000, 0, 1, and ϵ should be accepted. The strings 0101, 2, 000020, 102000, 011, should be rejected.

Solution:



(b) Construct an NFA for the language "all binary strings that have a 1 as one of the last three digits".

Solution:

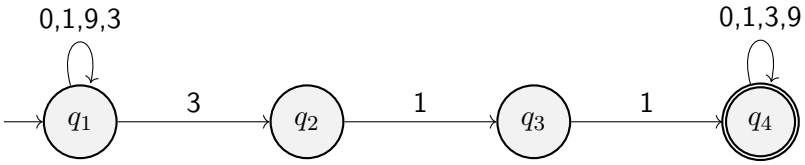


2. DFA to NFA, DFA Minimization

Let L be the language where the alphabet is $\Sigma = \{0, 1, 3, 9\}$ such that $w \in L$ iff. The string "311" is a substring of w.

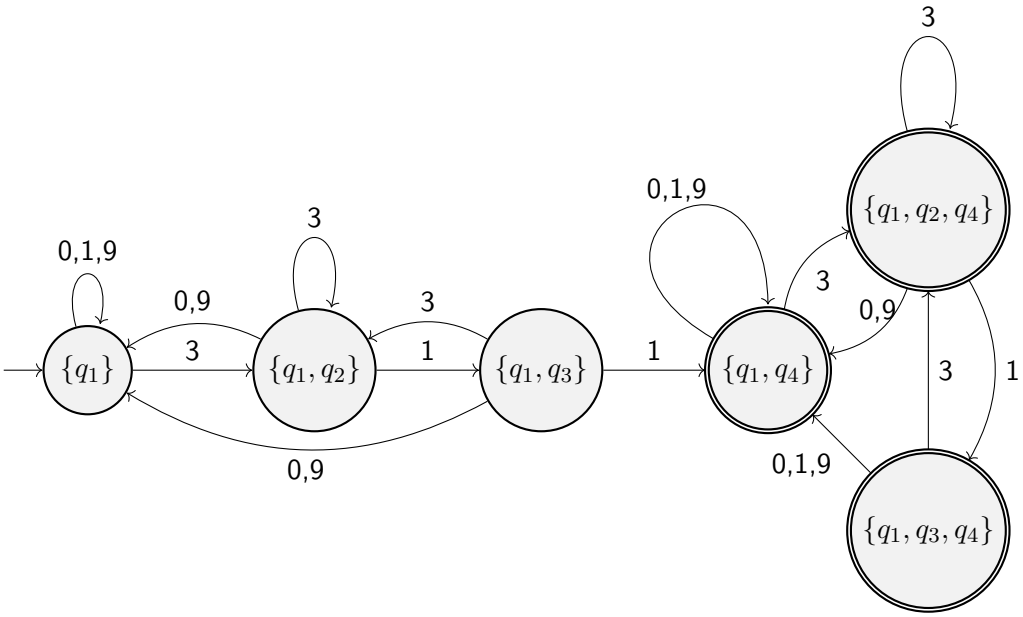
(a) Give an NFA to accept strings in L.

Solution:



(b) Give an equivalent DFA for your NFA (using the algorithm from 311).

Solution:



(c) Is your DFA minimized? If not, give the minimized DFA using the algorithm from 311.

Solution: