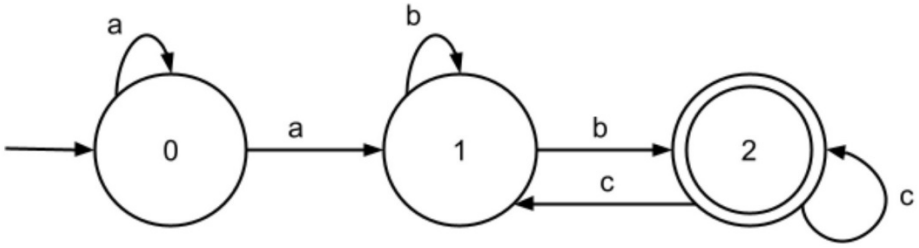
CMSC 330 Quiz 2 Fall 2021 Solutions

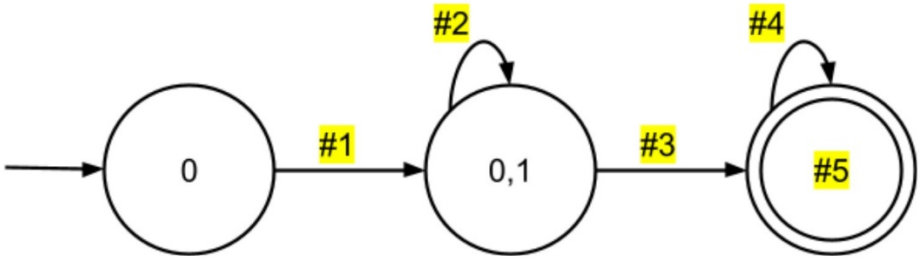
Q1. NFA to DFA

Consider the following NFA and DFA:

NFA:



DFA:



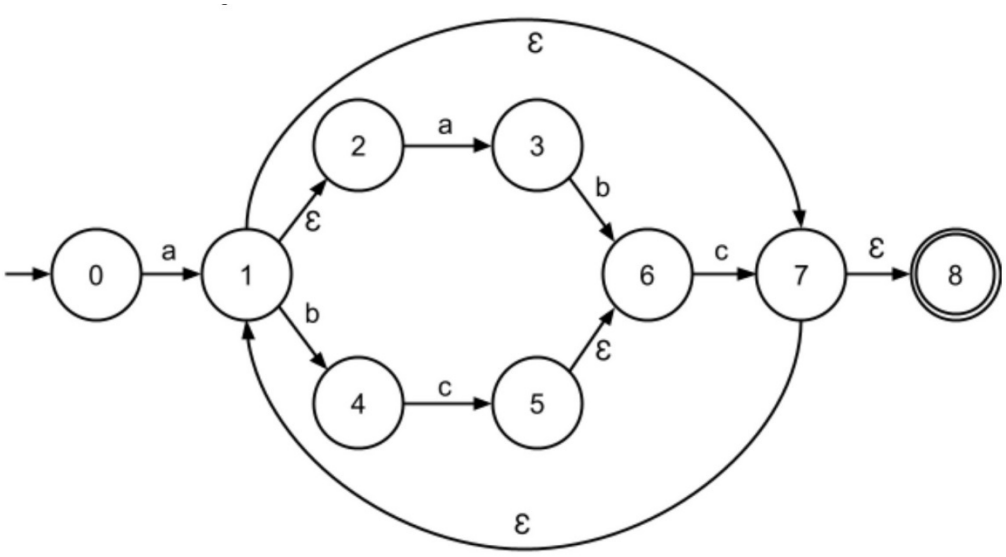
Use subset construction - the NFA to DFA algorithm covered in class - to fill in the blanks on the DFA so that the given NFA and DFA are equivalent.

Note: Use commas to separate if a blank corresponds to a set of states or a set of possible transitions.

#1: a
#2: a
#3: b
#4: b, c
#5: 1, 2

Q2. NFA to Regular Expression

Consider the following NFA:



Note: You can open this image in a new tab to make it easier to reference.

Q2.1. Write down the regular expression for the language accepted by the NFA.

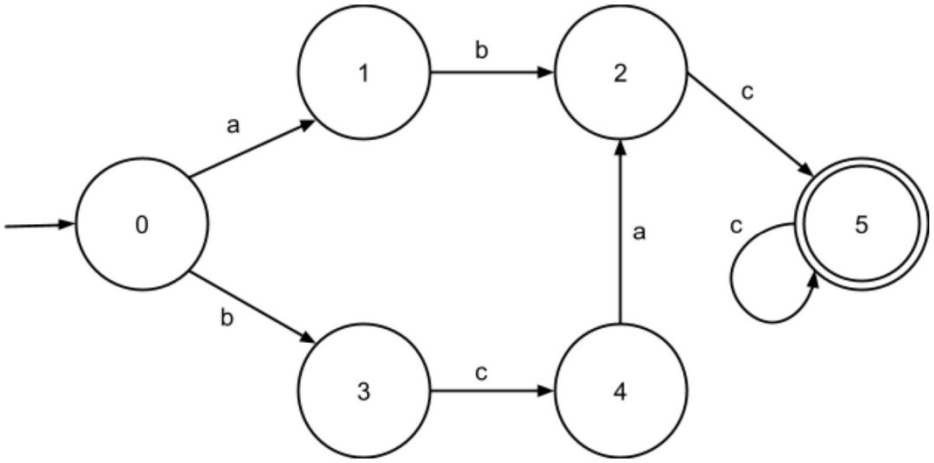
a((ab|bc)c)*

Q2.2. Which of the following strings are accepted by the NFA? Select all that are accepted.

- abc
- aabcbcc
- a
- abca
- aabcabc

Q2. NFA to Regular Expression

Consider the following NFA:



Q3.1. What single transition could be added to modify the NFA to accept the input “bcacacac”?

Note: Use the notation (0, a, 1) to denote a transition from state 0 to state 1 on input a. You can use (0, e, 1) to denote an epsilon transition from state 0 to state 1.

(5, e, 4) or any other valid solution

Q3.2. Is the original NFA also a DFA? Explain why or why not.

Yes. There are no epsilon transitions and exactly one sequence of steps for each string.