Mary Shi

I pledge my honor that I have abided by the Stevens Honor System

Problem Set 3 CS 334

1. a). $(b \cup \epsilon)(a \cup ab)^* aa (b \cup \epsilon)(a \cup ab)^*$

b) $b^*(abb^*a)^*b^*$

c) $\#(a \cup b \cup /)^* \cup \#^*(a \cup b)(a \cup b \cup /)^*)^* \#/$

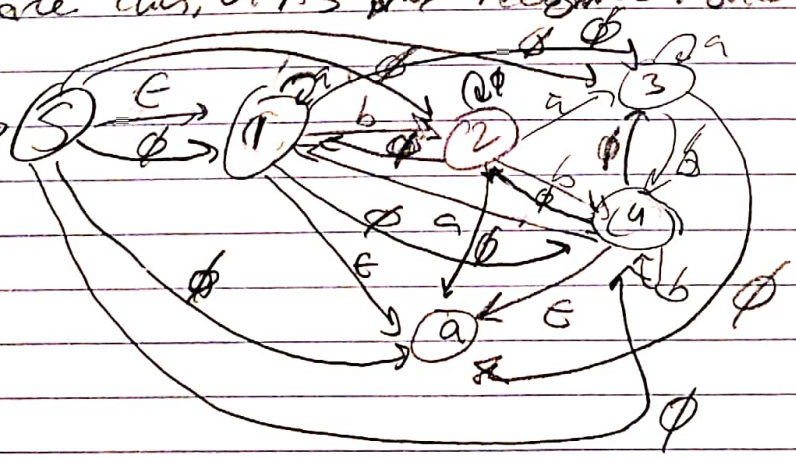
2. All:

Let L be any regular language. Because this language is regular, there exists a DFA for this language for which all paths end up in some accept state. Thus, for all strings w in this language, there is a path from the start state to an accept state. Thus, an NFA can be built that accepts for all paths made by the strings w, so that all strings w will end in accept states in an NFA. Inessence, if a path exists in a DFA, it can be recreated in an NFA. Thus, the NFA would accept these strings, thus proving if a language is regular, an NFA will accept it.

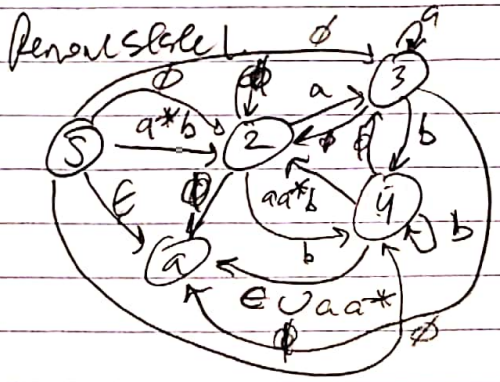
Only:

Let L be a non-regular language. Thus, no DFA accepts this language, and for all DFAs, there exist no paths from a start state to an accept state. Thus, there would exist no paths in any NFA that go from the start state to an accept state because an NFA is similar to an NFA in structure, there would also exist no paths in any NFA from the start to an accept state. Thus, NFAs only recognize regular languages.

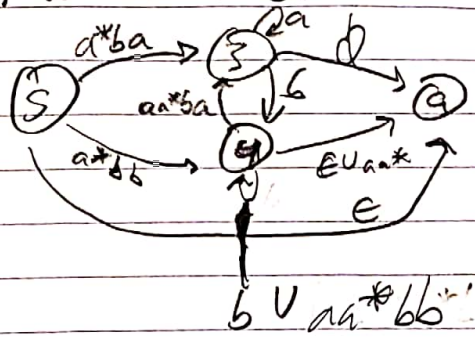
3.



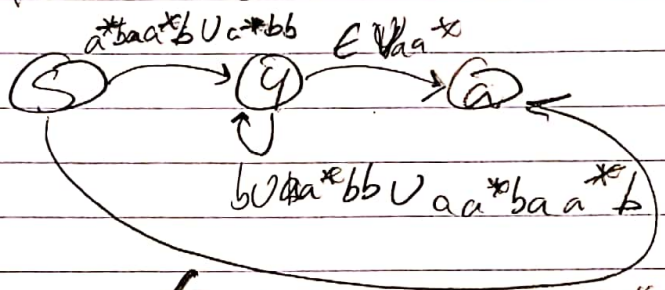
Remove state 1.



Remove state 2.



Remove state 3



$\epsilon \cup a^*bb(b \cup aa^*bb)^*(\epsilon \cup aa^*)$

Remove state 4.

$\epsilon \cup a^*bb(b \cup aa^*bb)^*(\epsilon \cup aa^*) \cup$
$(a^*baa^*b \cup a^*bb)(b \cup aa^*bb \cup aa^*baa^*b)^*(\epsilon \cup aaa^*)$

Final regex:

$\epsilon \cup a^*bb(b \cup aa^*bb)^*(\epsilon \cup aa^*) \cup$
$(a^*baa^*b \cup a^*bb)(b \cup aa^*bb \cup aa^*baa^*b)^*(\epsilon \cup aaa^*)$