CSCI 301 M6 Homework

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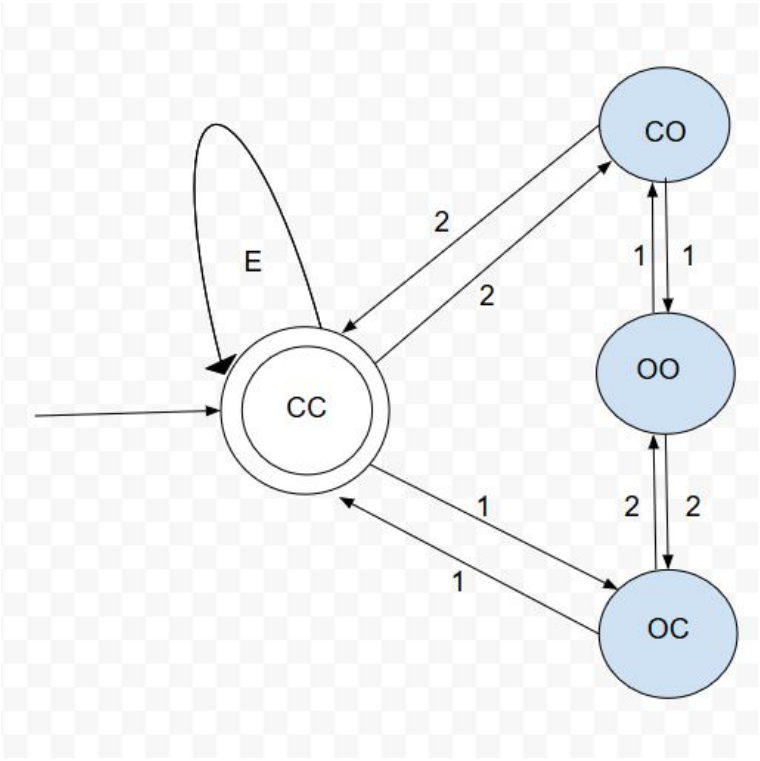
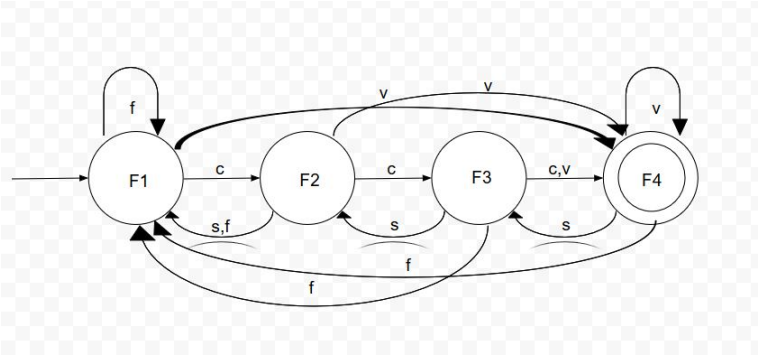
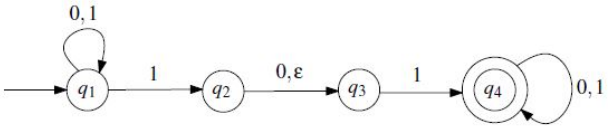
Collaboration statement: By submitting this assignment, I am attesting that this homework is in full compliance with the course's https://wwu.instructure.com/courses/1340003/pages/academic-dishonesty-guidelines Homework Collaboration Policy and with all the other relevant academic honesty policies of the course and university. I discussed this homework with no one and wrote this solution without input from anyone else.

1. 

2. 

3. Whenever an automaton reads a symbol that passes it to the next state, but does not receive a valid signal that can pass it from that state to the next, would be left hanging. The book has a great

example where, if from $q1$ to $q2$ a $(0,1)$ would work, (but $q1$ to $q1$ could take $(0,1)$ to loop back to $q1$), but then from $q2$ to $q3$ a $(0,\varepsilon)$ would work, we could take the ε) to $q3$ and if $q4$ required a 1 to pass to our final state, we could hang if we passed the string 010 to get to, but took the ε to $q3$, we would hang as $q3$ to $q4$ requires a 1, and we are left with 0 in our string. Seem picture example to follow.



4. (a) $L_1L_2L_3 = \{cat, ca, cot, co, cut, cu, rat, ra, rot, ro, rut, ru\}$.
   (b) $L_2^* = \{aou^n : n \in \mathbb{L}\} = \{aou, aouu, aouu, ...\}$.
   (c) $L_3^{10} = \{t, tt, ttt, tttt, ttttt, tttttt, ttttttt, tttttttt, ttttttttt, tttttttttt\}$.
   (d) $\varnothing$
   (e) $(L_1L_3) \cap L_1 = \{c, r\}$.
   (f) $L_1 \cup L_2^0 \cup \varnothing = \{\varnothing, c, r, \varepsilon\}$.