Middle East Technical University | Department of Computer Engineering

CENG 280

Formal Languages and Abstract Machines

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Homework 2

Name Surname: Batuhan Akçan
Student ID: 2580181

Answer for Q1

a. $(a(b+c)^*a+b+aa)(a+b)^*$

b.
A=: 0
B=: 1
C=: 0,1
D=: 2
E=: 1
F=: 0,2

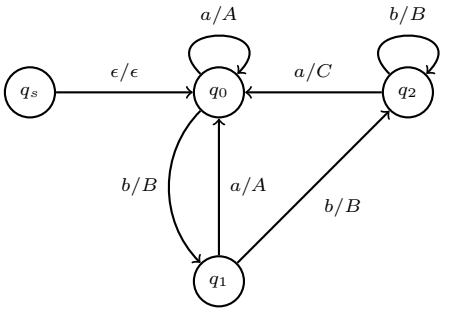
Answer for Q2

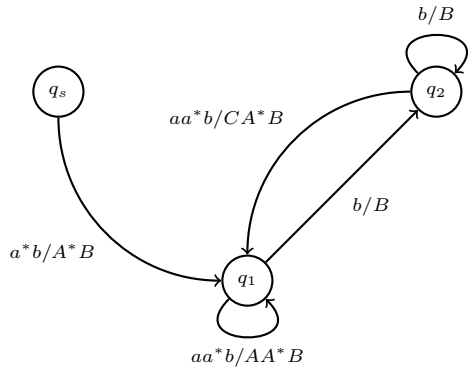
a. State Elimination Algorithm

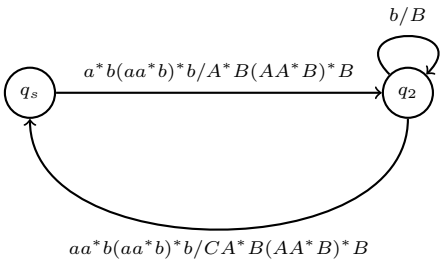
b.

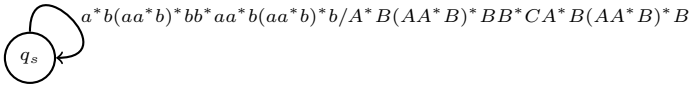
- Step 1 should be modified. If the start state is an accepting state or has transitions in, we should add a new non-accepting state and add the transition ϵ/ϵ between the new start state and the former start state. (Because we need to specify that the machine does not output anything while transitioning from the new start state and the former start state.)
- Step 3 should be modified. After eliminating a state, we should update transitions for not only input symbols, but also output symbols. At the end, there will be only 1 state left, which is the start state that we have added. Also, there will be only 1 transition left, which is a loop in the start state, of the form REGEX1/REGEX2 (REGEX1 standing for input regular expression, REGEX2 standing for output regular expression).

c.









Resultant set: $S = \{\ w \in O^* \mid \text{w ends with C}\ \} = \{\ w \in O^* \mid w = A^*B(AA^*B)^*BB^*C\ \}$
Regular expression: $A^*B(AA^*B)^*BB^*C$

Answer for Q3