

CENG 280

Formal Languages and Abstract Machines

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Homework 2

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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.

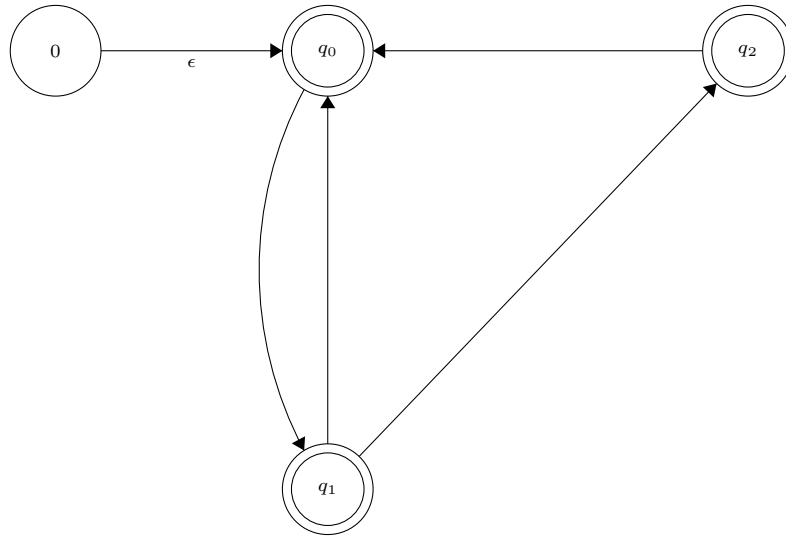
b. There is no change in Step 1: If the start state is an accepting state or has transitions in, add a new non-accepting start state and add an ϵ -transition between the new start state and the former start state.

Since there is no accepting state the step 2 is useless: If there is more than one accepting state or if the single accepting state has transitions out, add a new accepting state, make all other states non-accepting, and add an ϵ -transition from each former accepting state to the new accepting state.

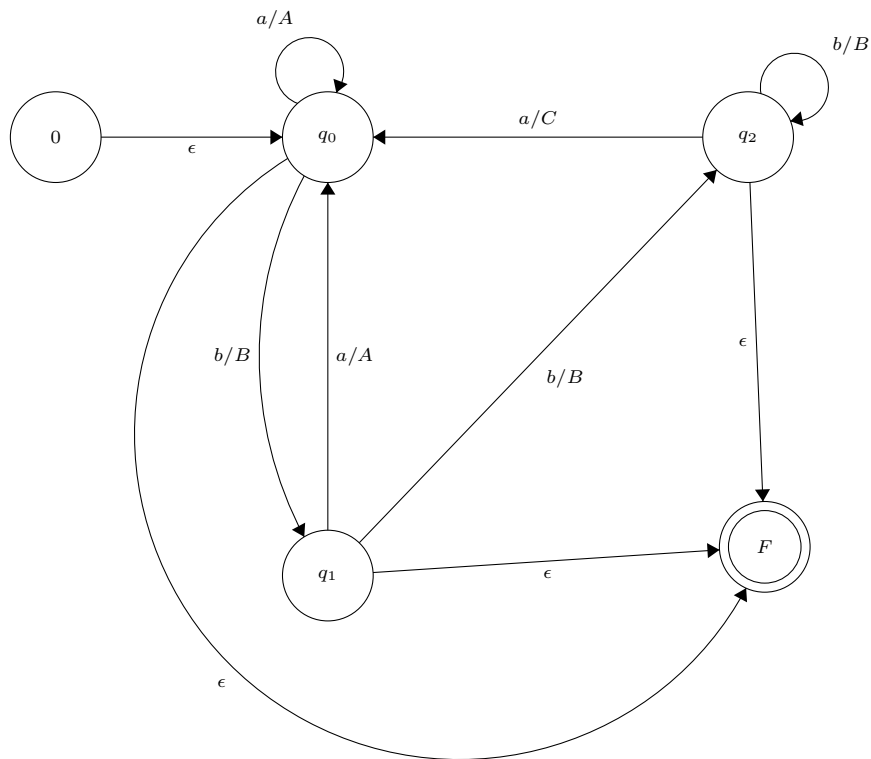
For step 3, we will eliminate the states and update the transition according to the procedure but while updating the transitions we will also consider the outputs. When we are done we would be left with the output language of the given Mealy Machine since we have wrote the outputs as well as the inputs.

c. In order to find this we will make all three states as final states then apply the procedure I defined in part b. This time step 2 will be useful again.

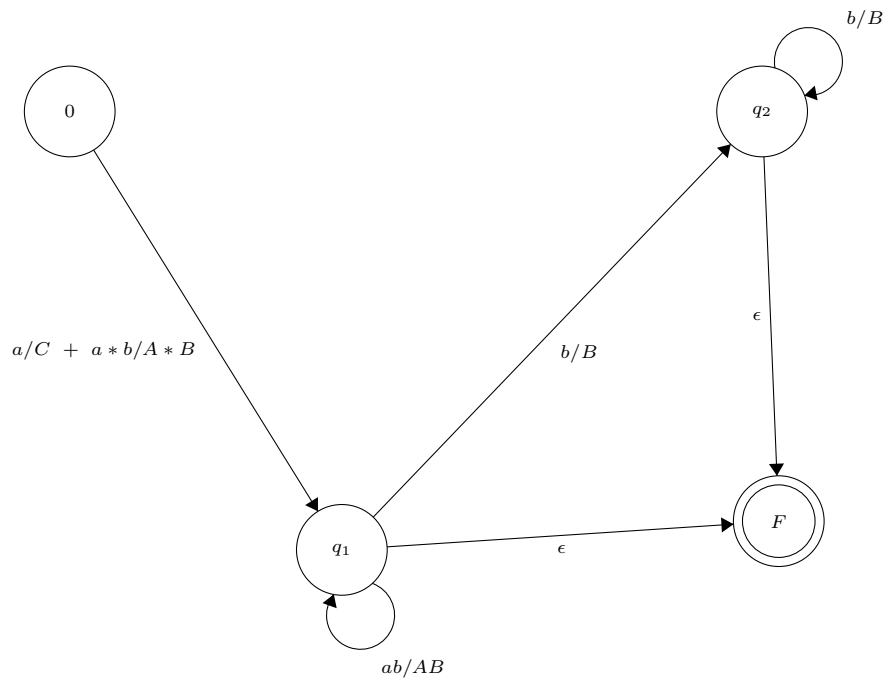
After step 1 (the non-written parts are unchanged);



After step 2 (the non-written parts are unchanged);

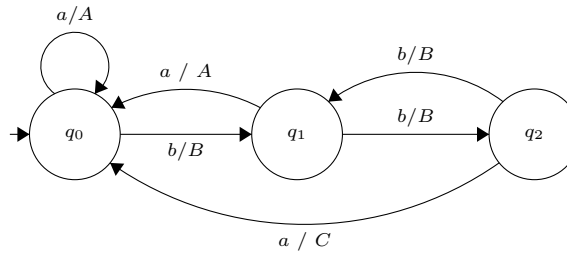


Elimination process will start like this and continue,



In final we will have the output regular expression that ends with C as $(A^*B(AB)^*BB^*C)^*$.

Answer for Q3



This is the black-box machine that checks if the input language is accepted, if it is accepted it sends the output to the starting states of the given NFA's but the NFA's should be transformed into DFA's aswell, state q_0 in the black box machine is the initial state of the N_3 , state q_2 is the initial state of N_2