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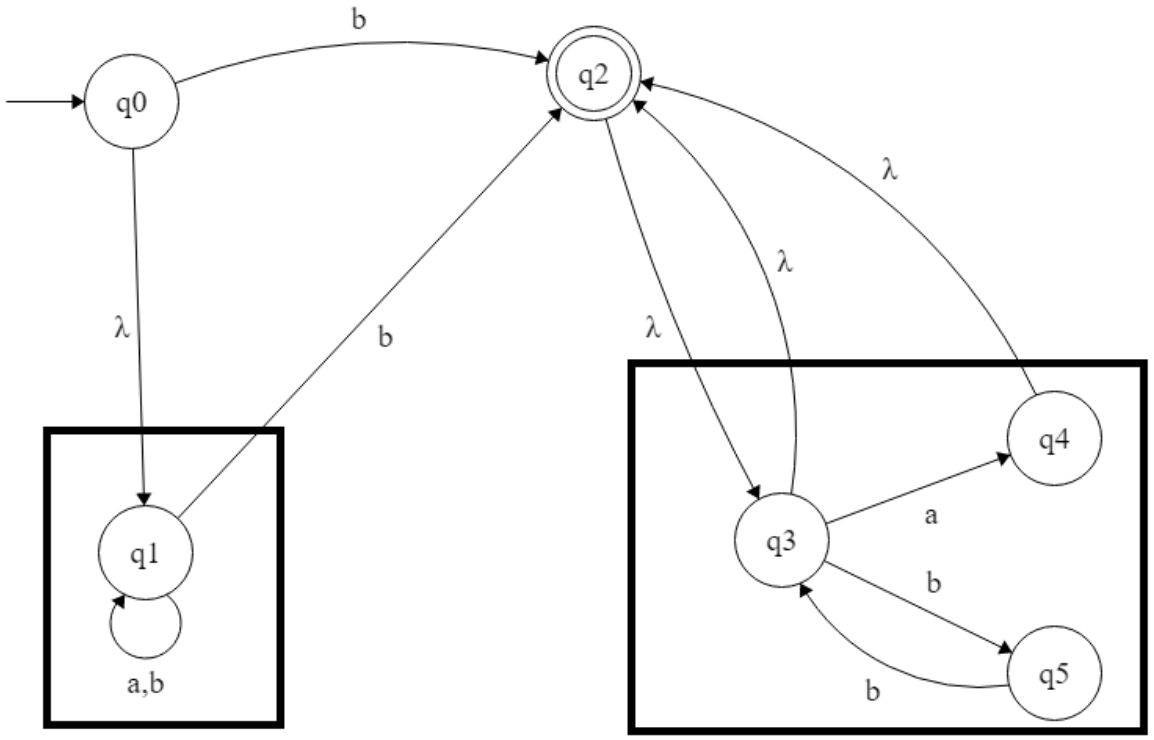
Theory of Computation

Assignment #3

Question 1:



σ(q0, a) = Φ, σ(q0, b) = q2, σ(q0, λ) = q1

σ(q1, a) = q1, σ(q1, b) = {q1, q2}

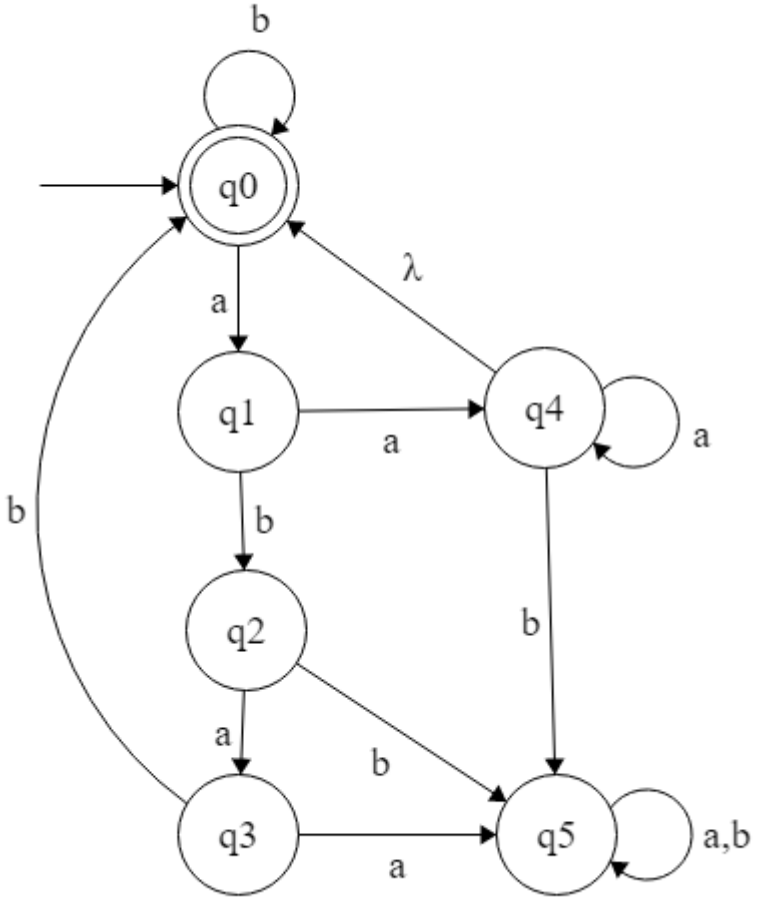
σ(q2, a) = σ(q2, b) = Φ, σ(q2, λ) = q3

σ(q3, a) = q4, σ(q3, b) = q5 σ(q3, λ) = q2

σ(q4, a) = σ(q4, b) = Φ, σ(q4, λ) = q2

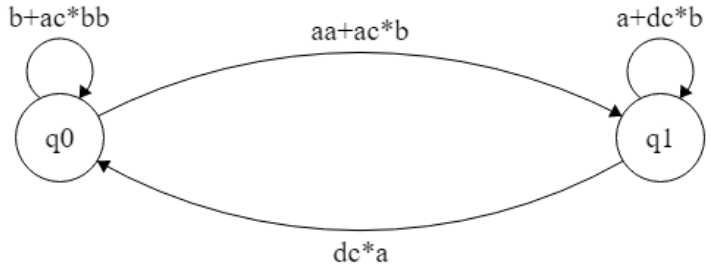
σ(q5, a) = Φ, σ(q5, b) = q3

Question 2:



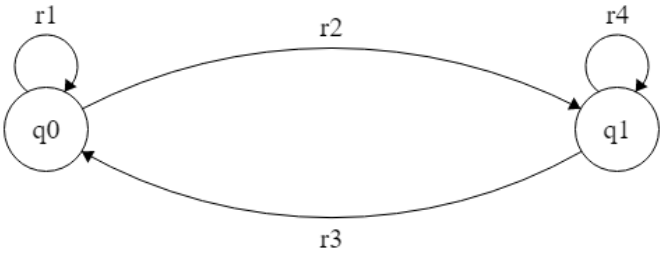
Question 3:

An equivalent graph with only two states would be:



Then by substituting each transition in the expression: r1*r2(r4 + r3r1*r2)*

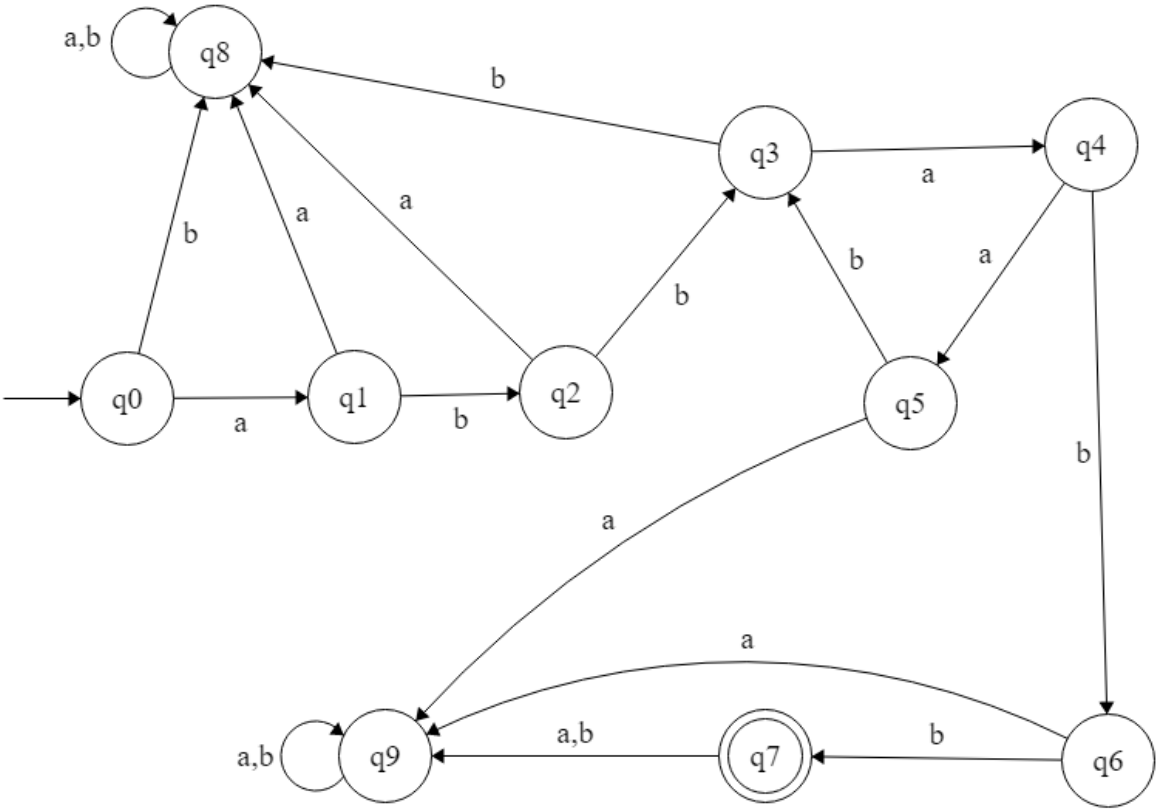
In the following GTG:



The result would be:

(b + ac*bb)*(aa + ac*b)((a + dc*b) + (dc*a)(b + ac*bb)* (aa + ac*b))*

Question 4:



σ(q0, a) = q1, σ(q0, b) = q8

σ(q1, a) = q8, σ(q1, b) = q2

σ(q2, a) = q8, σ(q2, b) = q3

σ(q3, a) = q4, σ(q3, b) = q8

σ(q4, a) = q5, σ(q4, b) = q6

σ(q5, a) = q9, σ(q5, b) = q3

σ(q6, a) = q9, σ(q6, b) = q7

σ(q7, a) = q9, σ(q7, b) = q9

σ(q8, a) = q8, σ(q8, b) = q8

σ(q9, a) = q9, σ(q9, b) = q9

Question 5:

The right linear Regular Grammer is:

$q_0 \rightarrow aq_1 \mid aq_2$

$q_1 \rightarrow \lambda q_3$

$q_2 \rightarrow bq_4$

$q_3 \rightarrow aq_2 \mid aq_3 \mid bq_5 \mid q_f$

$q_4 \rightarrow \lambda q_5 \mid aq_4$

$q_5 \rightarrow aq_5 \mid q_f$

$q_f \rightarrow \lambda$