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2/19/2022

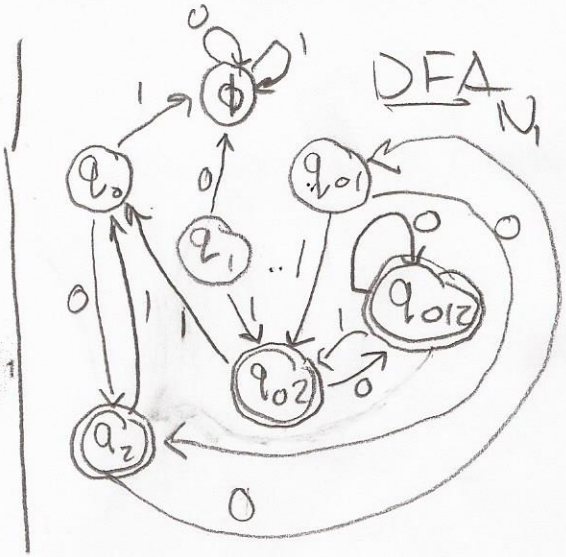
Introduction to Computation Theory
Quiz 2 – Finite State Machine (20 pts)

* On Another paper

Answer all questions

1. [6 pts] Design deterministic finite automata (DFAs) to recognize the following languages over the alphabet Σ = {x, y}.
   a. Every occurrence of the substring yy is followed by an x.
   b. Every third symbol is an x.
   c. All strings with an even number of x and an even number of y.

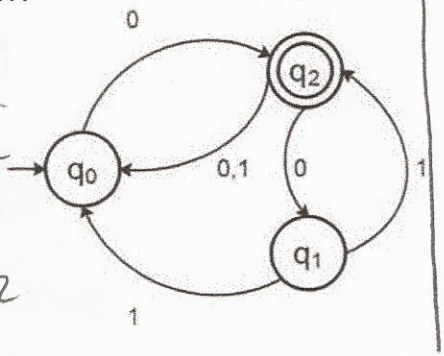
Pg 2



2. [14 pts] Convert the following NFA to DFA
   a. [5 pts] NFA N_1

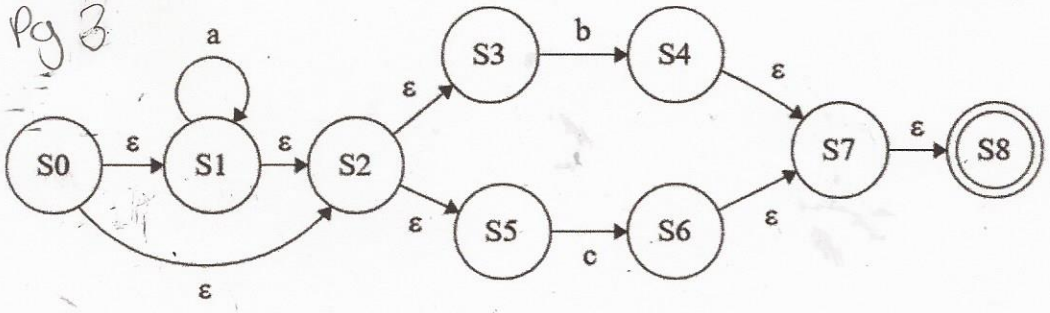
NFA	0	1
q_0	q_2	ϕ
q_1	ϕ	$q_0 q_2$
q_2	$q_1 q_0$	q_0
ϕ	ϕ	ϕ

DFA	0	1
q_0	q_{01}	q_2
q_{01}	q_{01}	q_{012}
q_2	q_{012}	q_{02}
q_{012}	q_{012}	q_{02}
q_{02}	q_{02}	q_0
ϕ	ϕ	ϕ



   b. [5 pts] NFA N_2 for a*(b|c)

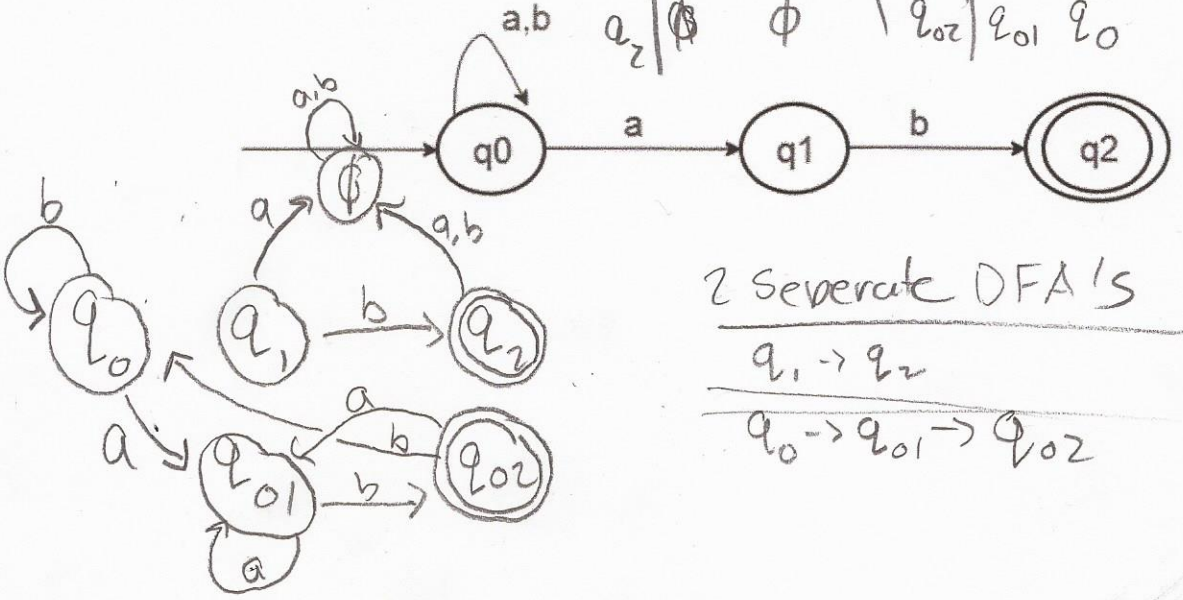
* Pg 3



   c. [4 pts] NFA N_3 Σ = (a, b)

NFA	a	b
q_0	q_{01}	q_0
q_1	ϕ	q_2
q_2	ϕ	ϕ

DFA	a	b
ϕ	ϕ	ϕ
q_{01}	q_{01}	$q_0 q_2$
q_{02}	q_{01}	q_0



2 Seperate DFA's

$q_1 \rightarrow q_2$

$q_0 \rightarrow q_{01} \rightarrow q_{02}$

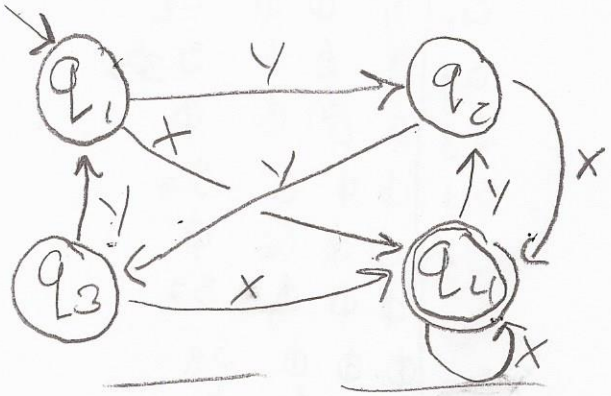
Pg 1

Quiz 2

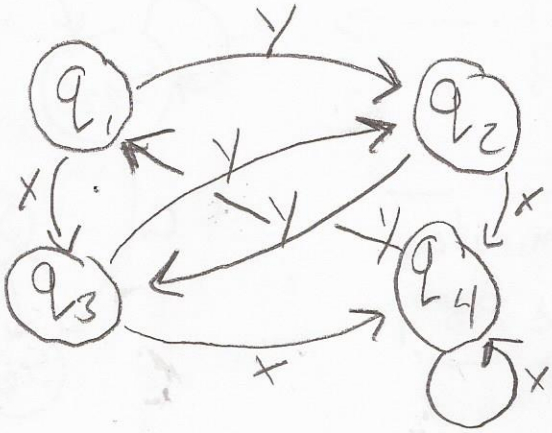
Erik Sundblad

Question 1

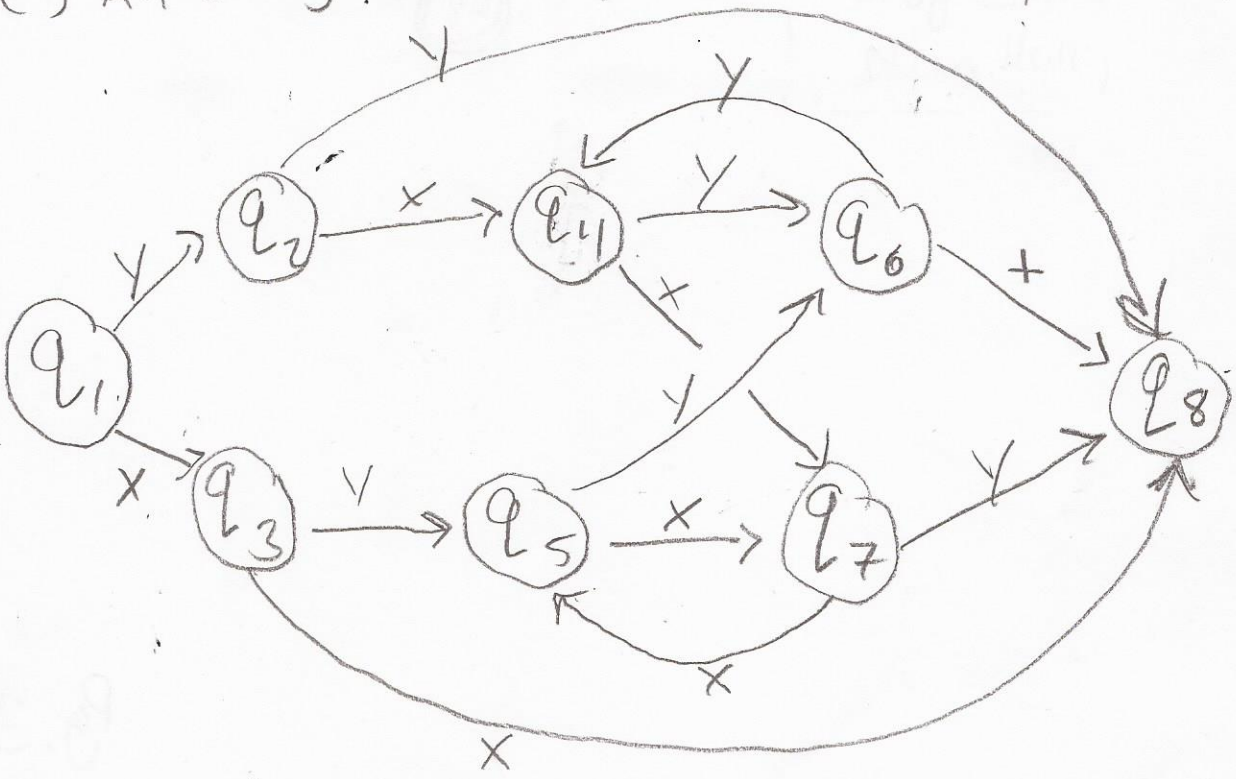
a) Every yy is followed by x



b) Every 3 symbol x



c) All strings with even x's and y's

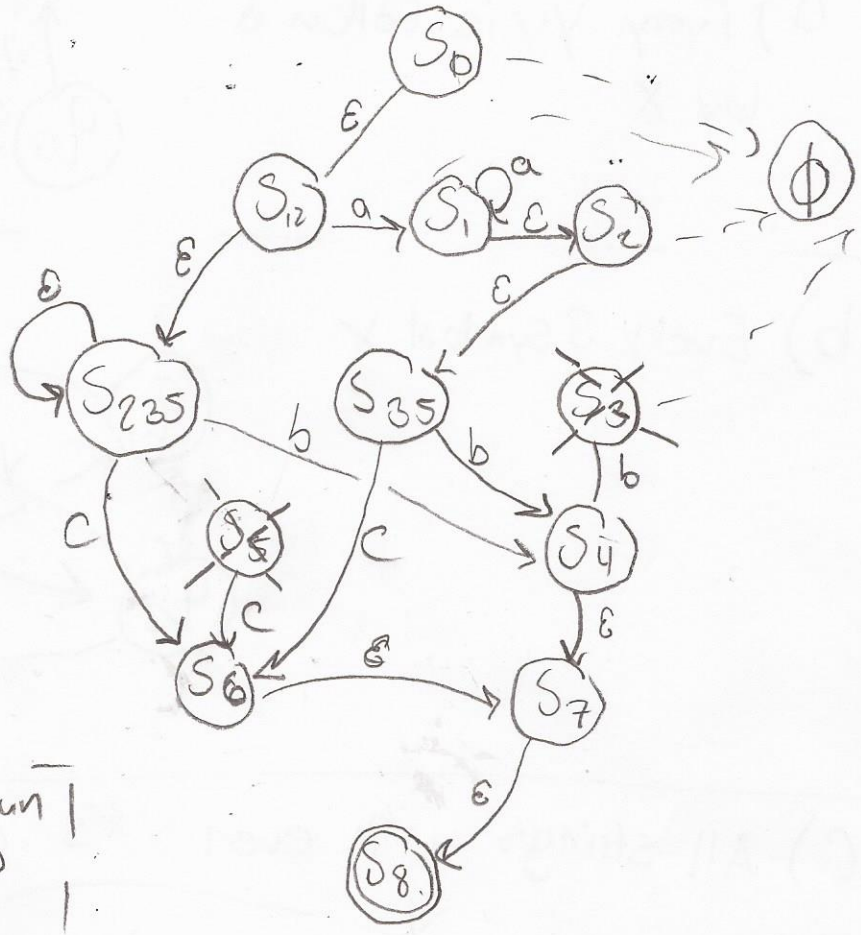


Q2

B

NFA	a	b	c	ε
S_0	ϕ	ϕ	ϕ	$S_1 S_2$
S_1	S_1	ϕ	ϕ	S_2
S_2	ϕ	ϕ	ϕ	$S_3 S_5$
S_3	ϕ	S_4	ϕ	ϕ
S_4	ϕ	ϕ	ϕ	S_7
S_5	ϕ	ϕ	S_6	ϕ
S_6	ϕ	ϕ	ϕ	S_7
S_7	ϕ	ϕ	ϕ	S_8
S_8	ϕ	ϕ	ϕ	ϕ
ϕ	ϕ	ϕ	ϕ	ϕ

DFA	a	b	c	ε
S_{12}	S_1	ϕ	ϕ	S_{235}
S_{35}	ϕ	S_4	S_6	ϕ
S_{235}	ϕ	S_4	S_6	S_{35}



Can eliminate S_3, and S_5

All not drawn lines go to null path