[CS M51A Fall 14] Quiz 3

Date: 11/21/14

- Please show all your work and write legibly, otherwise no partial credit will be given.
- **This should strictly be your own work; any form of collaboration will be penalized.**

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Student ID : _____

Section # : _____

Problem	Points	Score
1	20	
2	40	
Total	60	

Problem 1 (20 points)

Minimize the number of states of the system that corresponds to the table shown below. Show the final minimized table. The input is x and the output is z.

	Input	
PS	x=0	x=1
A	C,0	F,0
B	J,0	E,0
C	H,0	G,0
D	I,0	G,0
E	E,0	B,1
F	F,0	A,1
G	C,0	G,1
H	E,0	F,0
I	D,0	E,0
J	B,0	G,0
	NS,z	

P1 { A B C D H I J } { E F G }

P2 { A B C D I J } { H } { E . F } { G }.

P3. { A B I } { C } { D . J } { H . } { E F } { G }

P4 { A } { B I } { C } { D J } { H } { E F } { G }

P5 { A } { B I } { C } { D J } { H } { E } { F } { G }

P6 { A } { B I } { C } { D J } { H } { E } { F } { G }.

B D.

PS	X=0	X=1
A	C, 0	F, 0
B	D, 0	E, 0
C	H, 0	G, 0
D	B, 0	G, 0
E	E, 0	B, 1
F	F, 0	A, 1
G	C, 0	G, 1
H	E, 0	F, 0

NS, z.

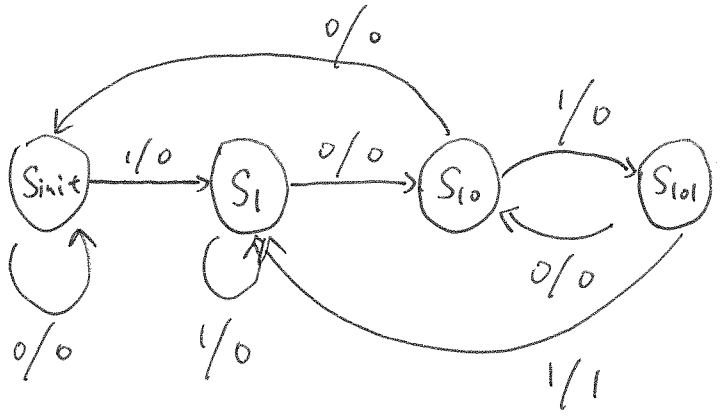
Problem 2 (40 points)

1. **(20 points)** Design a pattern detector that recognizes the pattern 1011, that is:

$$z(t) = \begin{cases} 1 & \text{if } x(t-3,t) = 1011 \\ 0 & \text{otherwise} \end{cases} \tag{1}$$

In addition, your design must meet the following requirements:
(1) overlap is allowed,
(2) use no more than 4 states.

Draw the state diagram below.



2. **(20 points)** Suppose you're asked to design a pattern detector that recognizes two patterns, 1011 and 1101.

   In addition, your design must meet the following requirements:
   (1) overlap is allowed,
   (2) use no more than 6 states.

   Draw the state diagram below.