

CDA Computer Logic Design

Homework 6

Fall 2016

Points: 100

- 1) Reduce the following state table to minimum number of states using the Implication chart method. (20 points)

Present State	Next State				Output
	Inputs (XY)				Z
	00	01	11	10	
A	B	I	C	G	0
B	B	C	F	G	0
C	H	D	D	F	1
D	H	C	E	G	1
E	B	C	I	G	0
F	F	I	I	K	0
G	J	K	G	H	0
H	E	F	C	G	0
I	I	I	I	D	0
J	B	F	C	G	0
K	A	C	E	G	1

- 2) Reduce the following state table to minimum number of states using Implication chart method. (20 points)

Present State	Next State		Output	
	X=0	X=1	X=0	X=1
A	F	B	0	0
B	F	G	0	0
C	C	G	0	0
D	A	B	0	0
E	E	D	1	0
F	A	A	0	0
G	F	A	0	0

- 3) (a) For the following state table, apply the three guidelines to generate three possible nonequivalent state assignments. Which one of these is preferred, and why? (10 points)
 (b) Using your answer to (a), derive D flip-flop input equations and the output equations. (10 points)

Present State	Next State				Outputs (PQ)			
	Inputs (XY)							
	XY = 00	01	11	10	XY = 00	01	11	10
A	A	A	C	C	01	01	01	01
B	B	D	B	D	11	11	11	11
C	A	A	B	D	11	11	00	00
D	D	D	A	C	01	01	01	01

- 4) (a) Consider the following Mealy sequential circuit. Derive the equations for a one-hot state assignment. (Show your answer in the form of a Boolean expression) (10 points)
(b) Implement the circuit using D-flip flops. (10 points)

Present State	Next State		Present Output	
	X=0	X=1	X=0	X=1
A	B	A	0	0
B	C	A	0	0
C	D	A	0	1
D	D	A	0	0

- 5) Circuits *M* and *N* have the state tables that follow.
Show that these are equivalent. (20 points)

Circuit M

Present State	Input(X)		Output(Z)
	0	1	
A	D	B	0
B	A	B	0
C	A	C	1
D	A	D	1

Circuit N

Present State	Input(X)		Output(Z)
	0	1	
A	E	A	1
B	F	B	1
C	E	D	0
D	E	C	0
E	B	D	0
F	B	C	0