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Homework #7

1.

	Present State	Next State W=0	Next State W=1	Output
	$y_2 y_1$	$Y_2 Y_1$	$Y_2 Y_1$	z
A	00	10	11	0
B	01	01	00	0
C	10	11	00	0
D	11	10	01	1

State Table:

Present State	Next state W=0	Next state W=1	Output
$y_2 y_1$	$Y_2 Y_1$	$Y_2 Y_1$	z
A	C	D	0
B	B	A	0
C	D	A	0
D	C	B	1

One-hot encoding:
State-Assigned Table (New):

	Present State	Next State W=0	Next State W=1	Output
	$y_4 y_3 y_2 y_1$	$y_4 y_3 y_2 y_1$	$y_4 y_3 y_2 y_1$	z
A	0001	0100	1000	0
B	0010	0010	0001	0
C	0100	1000	0001	0
D	1000	0100	0010	1

(cont.)

1. Synthesize a circuit (using truth table):

$W y_2 y_1$	$Y_2 Y_1$
000	10
001	01
010	11
011	10
100	11
101	00
110	00
111	01

Y_2:

y_1 \ Wy_2	00	01	11	10
0	[1]	(1)	0	[1]
1	0	(1)	0	0

Y_1:

y_1 \ Wy_2	00	01	11	10
0	0	(1)	0	(1)
1	(1)	0	(1)	0

$$Y_2 = \overline{W}\, y_2 + \overline{y_1}\, \overline{y_2} = \overline{W}\, y_2 + \overline{y_1 + y_2}$$

$$Y_1 = \overline{W}\, \overline{y_2}\, y_1 + \overline{W}\, y_2\, \overline{y_1} + W y_2 y_1 + W\, \overline{y_2}\, \overline{y_1}$$

$$= \overline{W}\,(y_2 \oplus y_1) + W\,\overline{(y_2 \oplus y_1)}$$

$$= W \oplus y_2 \oplus y_1$$

$$Z = y_2 y_1$$

(Cont.)

1.