

9/5/2018

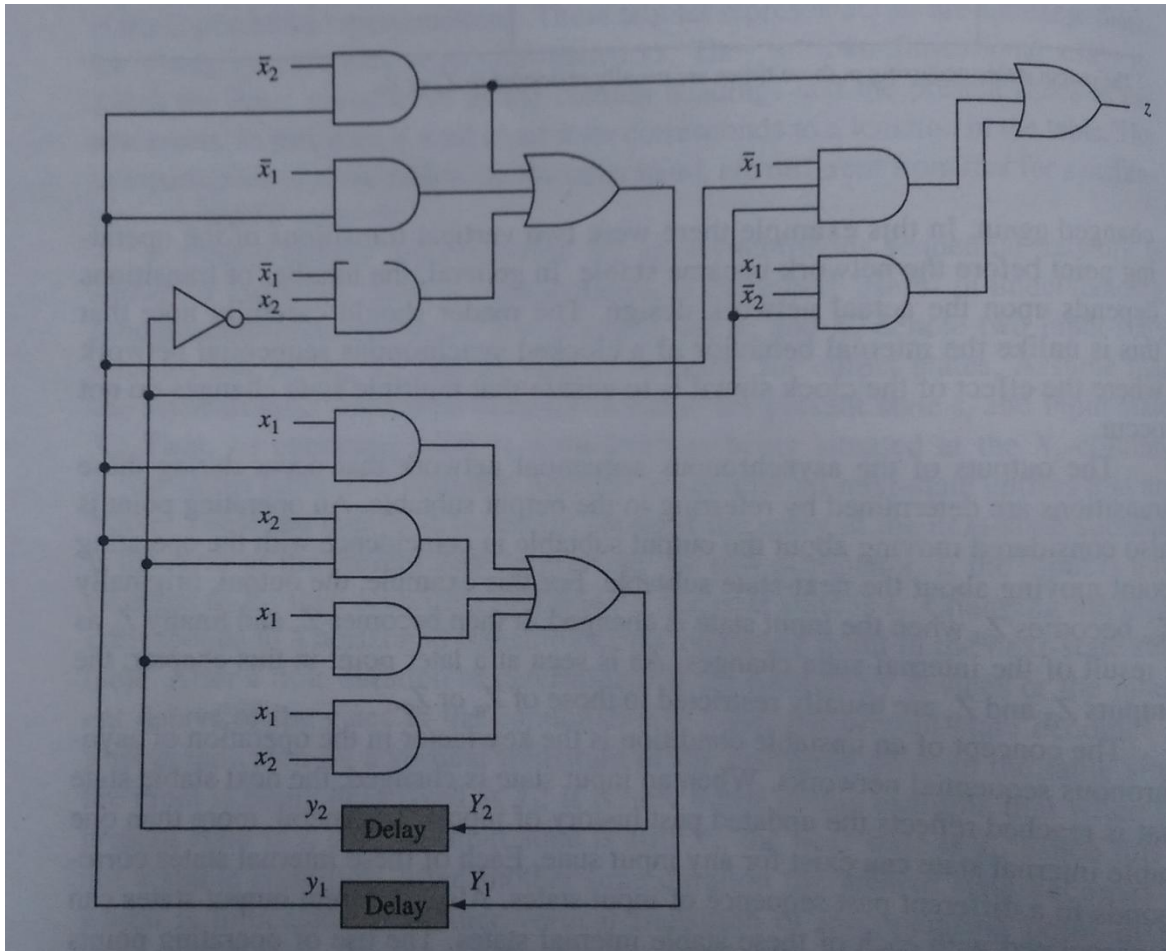
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ANALYSIS OF ASYNCHRONOUS SEQUENTIAL CIRCUITS



1

LOGIC DIAGRAM



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$$z = \bar{x}_2 y_1 + \bar{x}_1 y_1 y_2 + x_1 \bar{x}_2 y_2$$

$$Y_1 = \bar{x}_2 y_1 + \bar{x}_1 y_1 + \bar{x}_1 x_2 \bar{y}_2$$

$$Y_2 = x_1 y_1 + x_2 y_1 y_2 + x_1 y_2 + x_1 x_2$$

THE EXCITATION TABLE

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Table 9.2 Excitation/transition table for Example 9.1

Present state (y_1y_2)	Excitation/Next state (Y_1Y_2)				Output (z)			
	Input state (x_1x_2)				Input state (x_1x_2)			
	00	01	10	11	00	01	10	11
00	00	10	00	01	0	0	0	0
01	00	00	01	01	0	0	1	0
10	10	10	11	01	1	0	1	0
11	10	11	11	01	1	1	1	0

THE STATE TABLE

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Table 9.5 State table for Example 9.1

Present state	Next state				Output (z)			
	Input state (x_1x_2)				Input state (x_1x_2)			
	00	01	10	11	00	01	10	11
00 \rightarrow A	(A)	C	(A)	B	0	0	0	0
01 \rightarrow B	A	A	(B)	(B)	0	0	1	0
10 \rightarrow C	(C)	(C)	D	B	1	0	1	0
11 \rightarrow D	C	(D)	(D)	B	1	1	1	0

THE FLOW TABLE

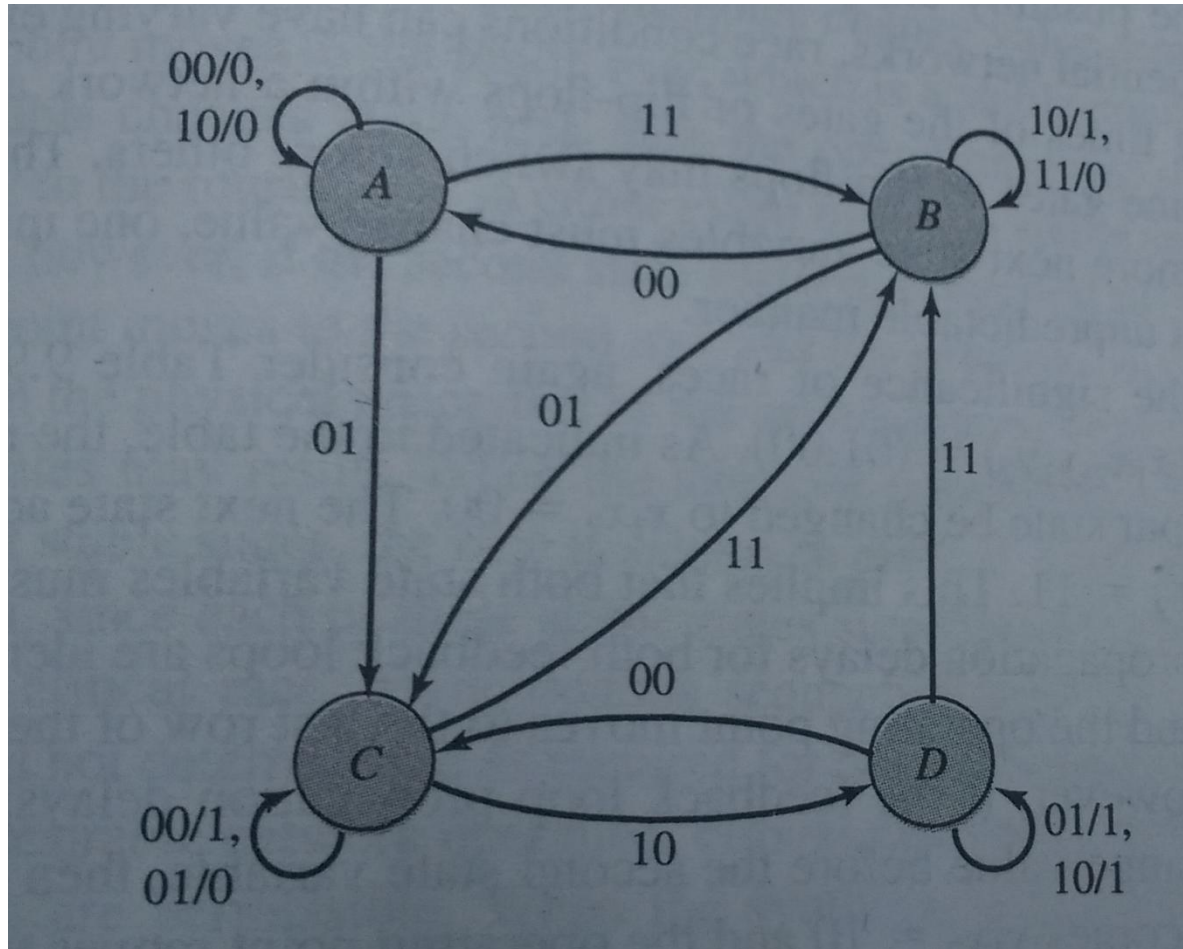
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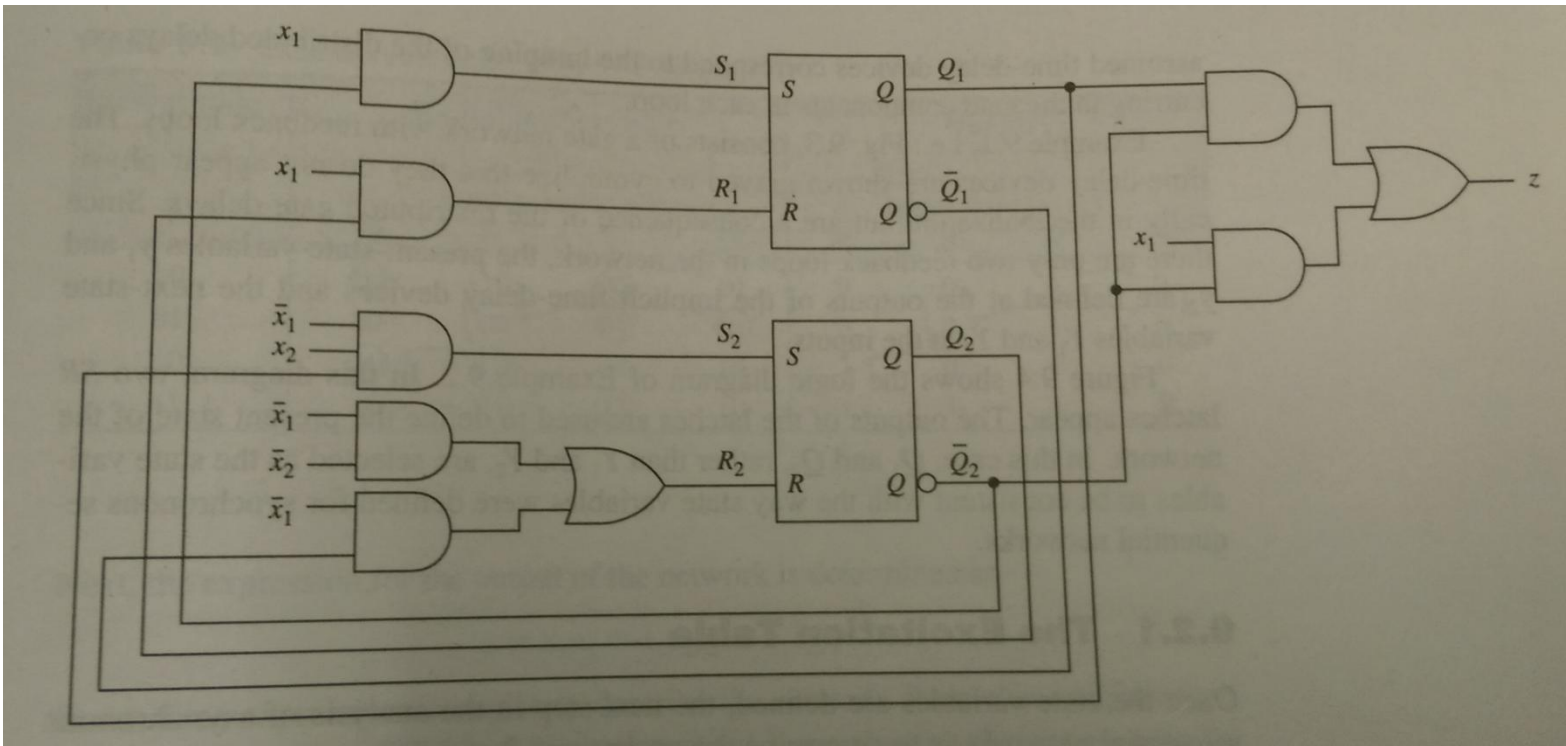
Table 9.7 Flow table for Example 9.1

Present state	Next state				Output (z)			
	Input state (x_1x_2)				Input state (x_1x_2)			
	00	01	10	11	00	01	10	11
<i>A</i>	Ⓐ	<i>C</i>	Ⓐ	<i>B</i>	0	–	0	–
<i>B</i>	<i>A</i>	<i>C</i>	Ⓑ	Ⓑ	–	–	1	0
<i>C</i>	Ⓒ	Ⓒ	<i>D</i>	<i>B</i>	1	0	–	–
<i>D</i>	<i>C</i>	Ⓓ	Ⓓ	<i>B</i>	–	1	1	–

THE FLOW DIAGRAM



LOGIC DIAGRAM



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$$z = \bar{x}_2 y_1 + \bar{x}_1 y_1 y_2 + x_1 \bar{x}_2 y_2$$

$$S_1 = x_1 \bar{Q}_2$$

$$R_1 = x_1 Q_2$$

$$S_2 = \bar{x}_1 x_2 Q_1$$

$$R_2 = \bar{x}_1 \bar{x}_2 + \bar{x}_1 \bar{Q}_1$$

EXCITATION TABLE

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Table 9.3 Excitation table for Example 9.2

Present state (Q_1Q_2)	Excitation (S_1R_1, S_2R_2)				Output (z)			
	Input state (x_1x_2)				Input state (x_1x_2)			
	00	01	10	11	00	01	10	11
00	00,01	00,01	10,00	10,00	0	0	1	1
01	00,01	00,01	01,00	01,00	0	0	0	0
10	00,01	00,10	10,00	10,00	1	1	1	1
11	00,01	00,10	01,00	01,00	0	0	0	0

THE TRANSITION TABLE

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Table 9.4 Transition table for Example 9.2

Present state (Q_1Q_2)	Next state ($Q_1^+Q_2^+$)				Output (z)			
	Input state (x_1x_2)				Input state (x_1x_2)			
	00	01	10	11	00	01	10	11
00	00	00	10	10	0	0	1	1
01	00	00	01	01	0	0	0	0
10	10	11	10	10	1	1	1	1
11	10	11	01	01	0	0	0	0

EXCITATION TABLE

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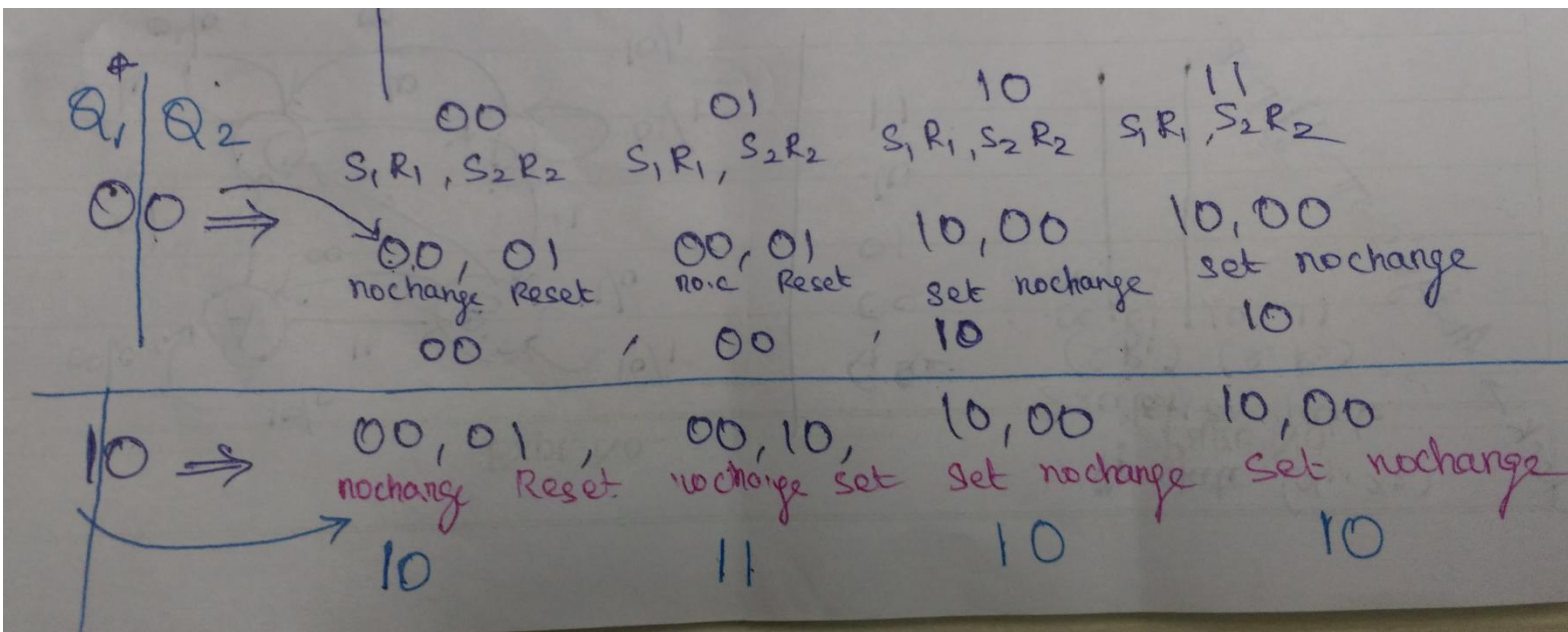
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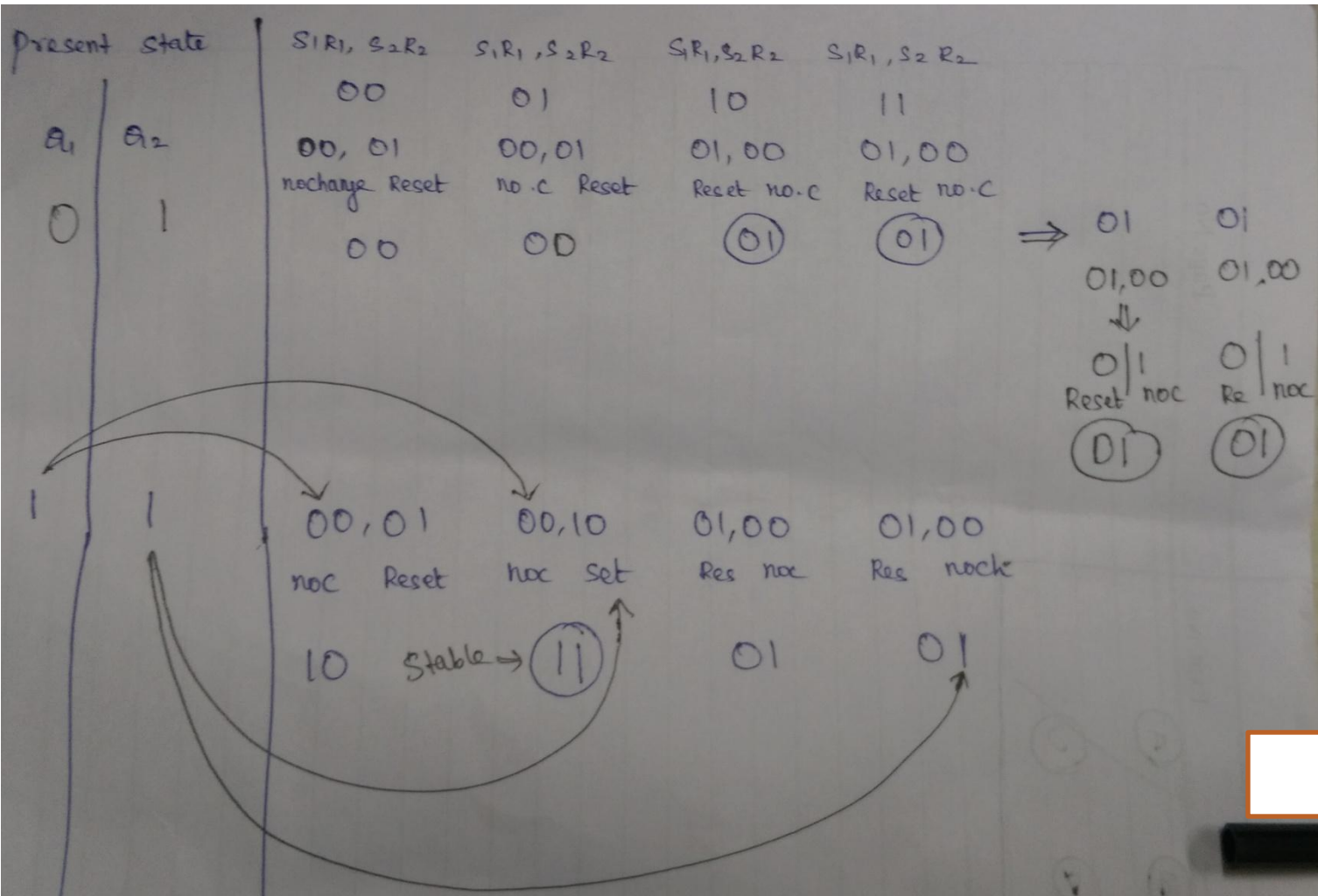
Present state $Q_1 Q_2$	(X_1, X_2)				$o/p z$ (X_1, X_2)			
	$S_1 R_1, S_2 R_2$	$S_1 R_1, S_2 R_2$	$S_1 R_1, S_2 R_2$	$S_1 R_1, S_2 R_2$	00	01	10	11
00	00, 01	00, 01	10, 00	10, 00	0	0	1	1
01	00, 01	00, 01	01, 00	01, 00	0	0	0	0
10	00, 01	00, 01	10, 00	10, 00	1	1	1	1
11	00, 01	00, 10	01, 00	01, 00	0	0	0	0

TRANSITION TABLE

Transition Table:

Present state	Q_1^+	Q_2^+	i/p state (x_1, x_2)	
	00	01	10	11
00	00	00	10	01
01				
10	10	11	10	10
11				





THE STATE TABLE

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Table 9.6 State table for Example 9.2

Present state	Next state				Output (z)			
	Input state (x_1x_2)				Input state (x_1x_2)			
	00	01	10	11	00	01	10	11
$00 \rightarrow A$	\textcircled{A}	\textcircled{A}	C	C	0	0	1	1
$01 \rightarrow B$	A	A	\textcircled{B}	\textcircled{B}	0	0	0	0
$10 \rightarrow C$	\textcircled{C}	D	\textcircled{C}	\textcircled{C}	1	1	1	1
$11 \rightarrow D$	C	\textcircled{D}	B	B	0	0	0	0

THE FLOW TABLE

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Table 9.8 Flow table for Example 9.2

Present state	Next state				Output (z)			
	Input state (x_1x_2)				Input state (x_1x_2)			
	00	01	10	11	00	01	10	11
<i>A</i>	(A)	(A)	<i>C</i>	<i>C</i>	0	0	–	–
<i>B</i>	<i>A</i>	<i>A</i>	(B)	(B)	–	–	0	0
<i>C</i>	(C)	<i>D</i>	(C)	(C)	1	–	1	1
<i>D</i>	<i>C</i>	(D)	–	<i>B</i>	–	0	–	–

THE FLOW DIAGRAM

