

Homework #8

5.12 For the following state table

Present State	Next State		Output	
	$x = 0$	$x = 1$	$x = 0$	$x = 1$
<i>a</i>	<i>f</i>	<i>b</i>	0	0
<i>b</i>	<i>d</i>	<i>c</i>	0	0
<i>c</i>	<i>f</i>	<i>e</i>	0	0
<i>d</i>	<i>g</i>	<i>a</i>	1	0
<i>e</i>	<i>d</i>	<i>c</i>	0	0
<i>f</i>	<i>f</i>	<i>b</i>	1	1
<i>g</i>	<i>g</i>	<i>h</i>	0	1
<i>h</i>	<i>g</i>	<i>a</i>	1	0

- (a) Draw the corresponding state diagram.
- (b)* Tabulate the reduced state table.

5.13 Starting from state *a*, and the input sequence 01010010111, determine the output sequence for

- (a) The state table of the previous problem.
- (b) The reduced state table from the previous problem. Show that the same output sequence is obtained for both.

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- 5.15** List a state table for the T flip-flop using Q as the present and next state and T as inputs. Design the sequential circuit specified by the state table using D flip-flop and show that it is equivalent to Fig. 5.13(b).
- 5.17** Design a one-input, one-output serial 2's complementer. The circuit accepts a string of bits from the input and generates the 2's complement at the output. The circuit can be reset asynchronously to start and end the operation.
- 5.18*** Design a sequential circuit with two JK flip-flops A and B and two inputs E and F . If $E = 0$, the circuit remains in the same state regardless of the value of F . When $E = 1$ and $F = 1$, the circuit goes through the state transitions from 00 to 01, to 10, to 11, back to 00, and repeats. When $E = 1$ and $F = 0$, the circuit goes through the state transitions from 00 to 11, to 10, to 01, back to 00, and repeats.