

Computer Organization and Architecture: Themes and Variations, 1<sup>st</sup> Edition Clements

**Latches**

The new output is not correct in the book

Inputs		Output	Description
R	S	Q <sup>+</sup>	
0	0	Q	No change
0	1	1	Set output to 1
1	0	0	Reset output to 0
1	1	X	Forbidden

Inputs			Output
R	S	Q	Q <sup>+</sup>
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	?
1	1	1	?

FIGURE 2.35 RS latch constructed from two cross-coupled NAND gates

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**The JK Flip-flop**

□ The JK is the most versatile of all flip-flops.

FIGURE 2.42 The JK flip-flop

J	K	Q	Q <sup>+</sup>
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	0

FIGURE 2.43 Construction of a basic JK flip-flop

The outer feedback is not correct in the book

The new output is not correct in the book

J = K = 1 toggles output

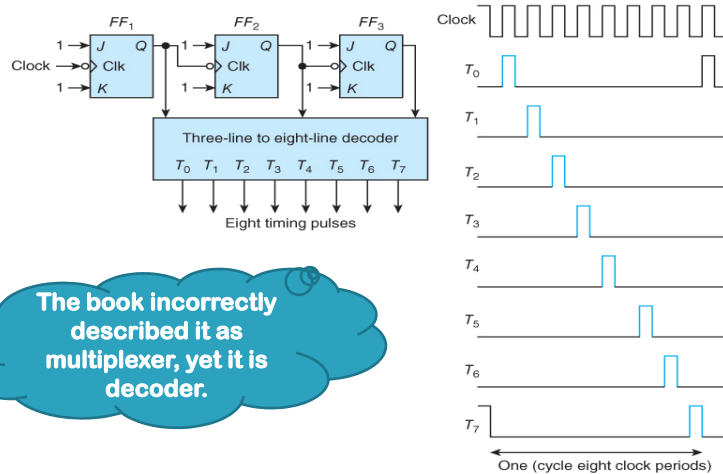
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## Using a Counter to Create a Sequencer

- We can combine the counter with the *decoder* (i.e., three-line to eight-line decoder) to create a sequence generator (*sequencer*) that
- produces a sequence of eight pulses  $T_0$  to  $T_7$ , one after another.

FIGURE 2.52 Combining a counter and a decoder



The book incorrectly described it as multiplexer, yet it is decoder.