DELD

Unit 4

Registers and Counters

Electronics Engineering Department

Registers

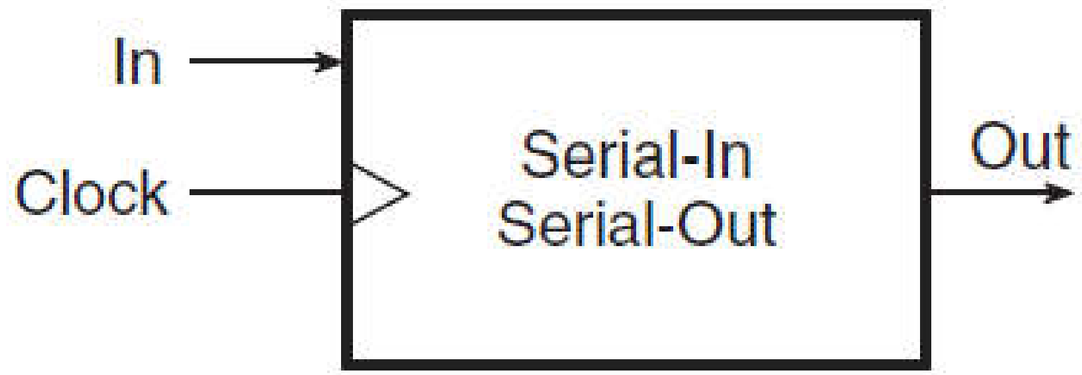
- An Array of Flip-Flops used to store binary information
- No. of Flip-Flops will be equal to the no of bits required to store the information
- Data can be entered serially or parallely
- It can also be used for Data movement
- Basically know as shift register, it shifts it output every clock pulse

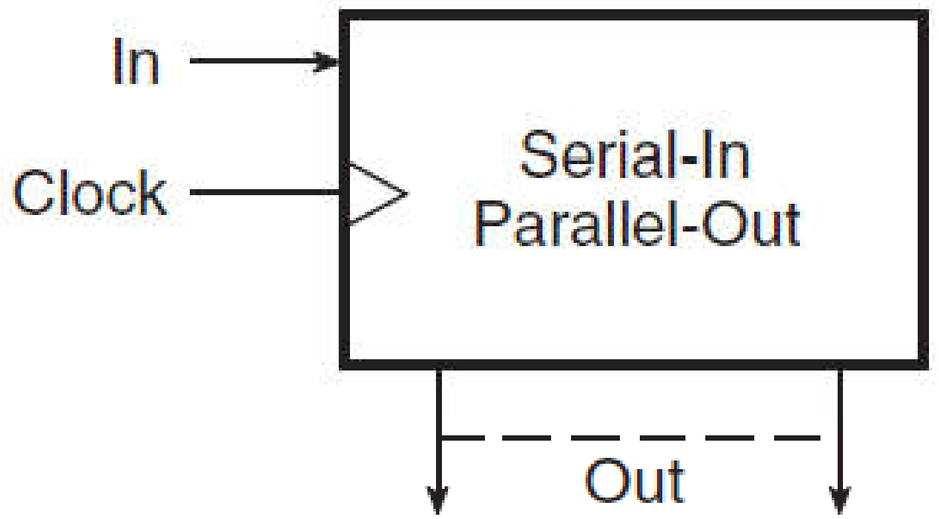
Types

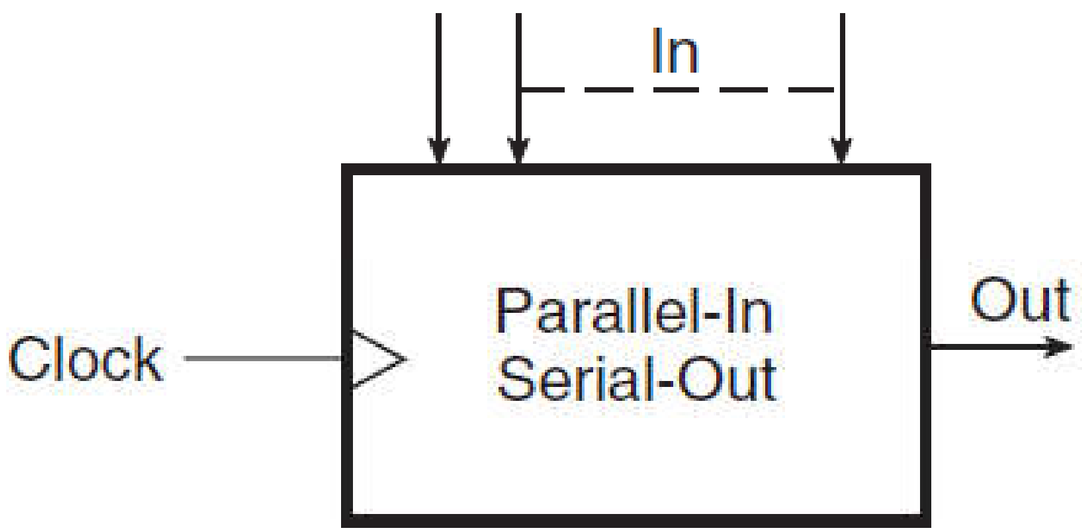
- Serial In Serial Out
- Serial In Parallel Out
- Parallel In Serial Out
- Parallel In Parallel Out

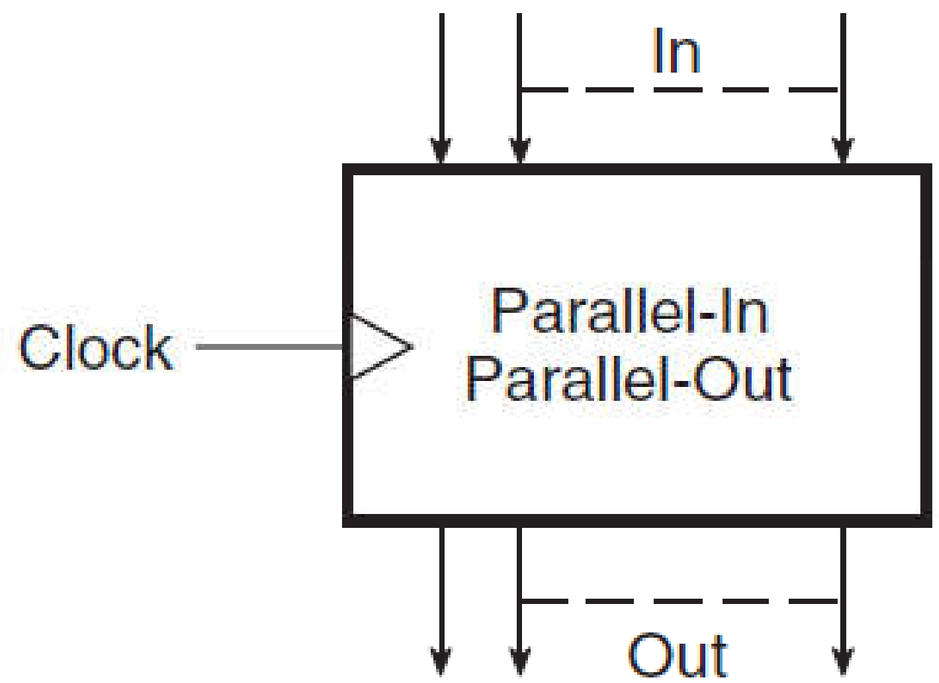
- Shift Left
- Shift Right

Types

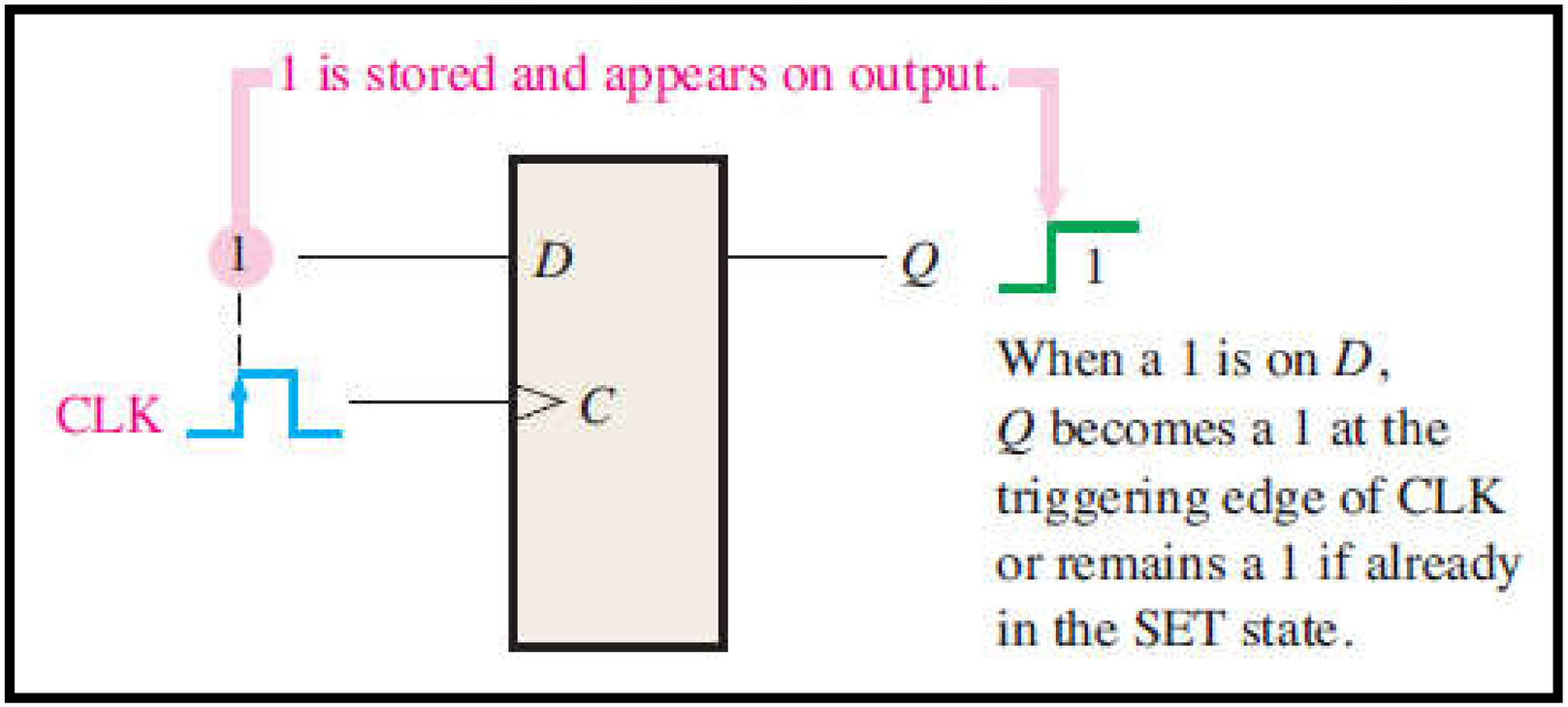

In
Clock
Serial-In
Serial-Out
Out

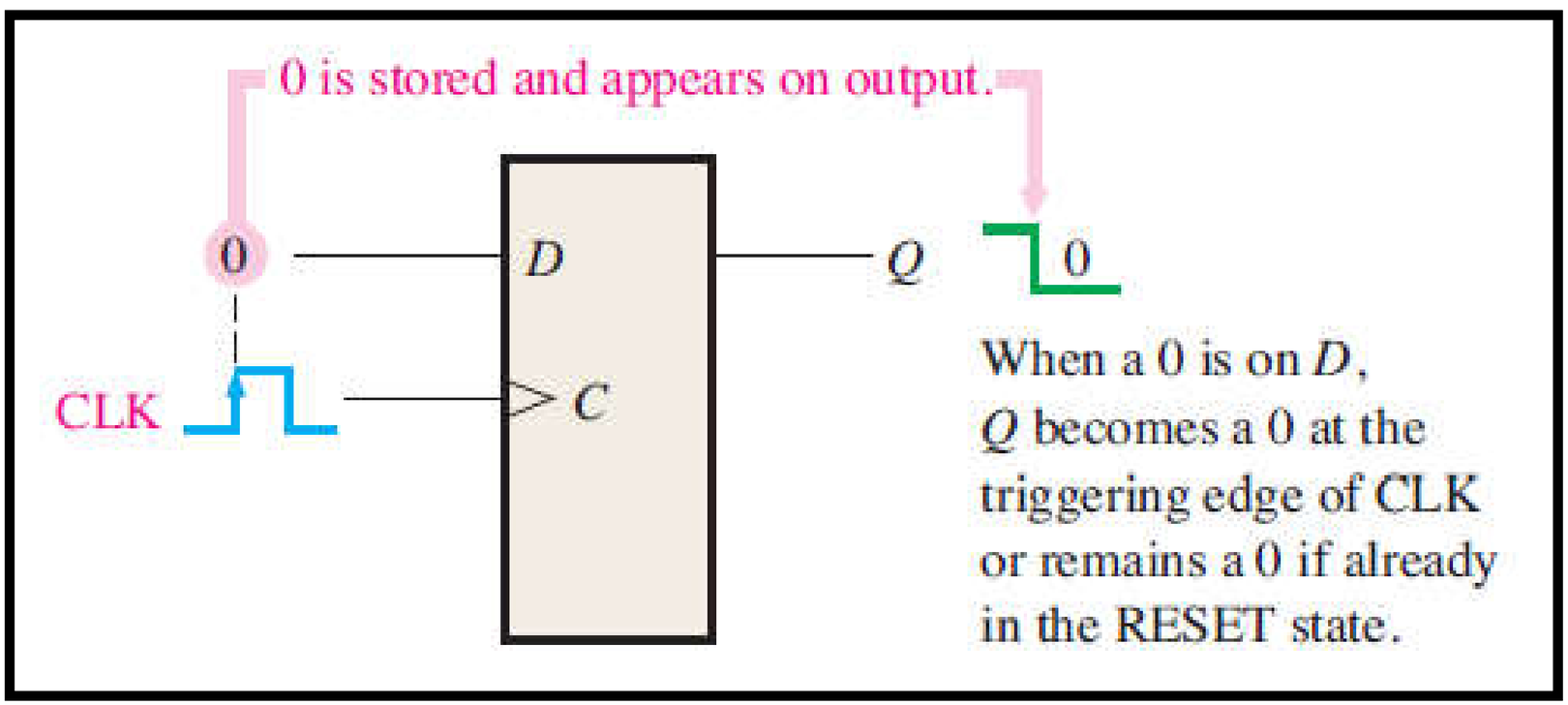

In
Clock
Serial-In
Parallel-Out
Out


In
Clock
Parallel-In
Serial-Out
Out

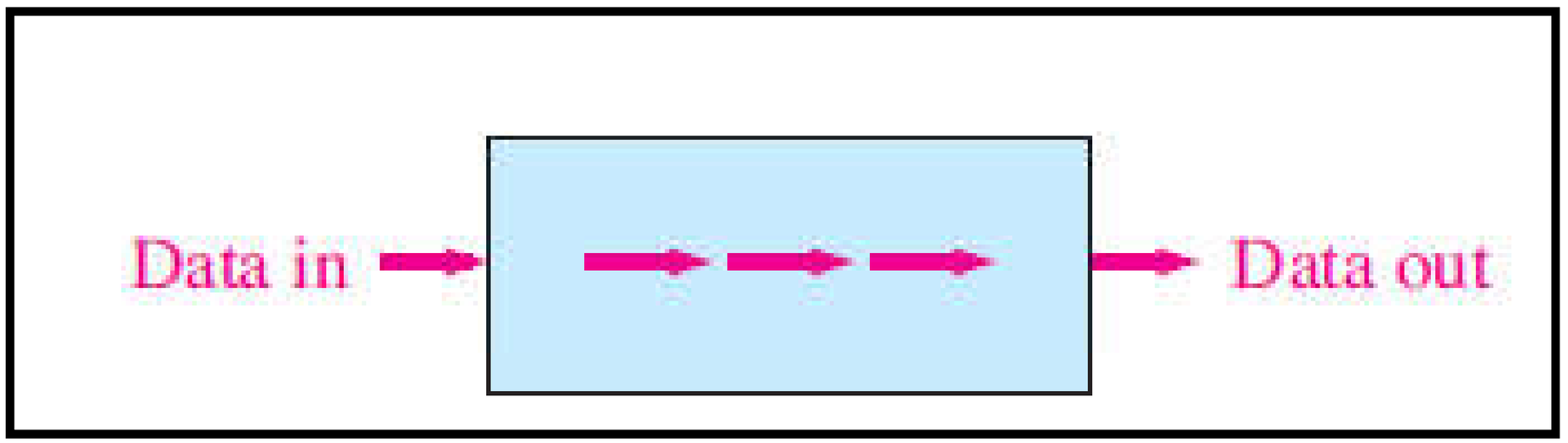

In
Clock
Parallel-In
Parallel-Out
Out

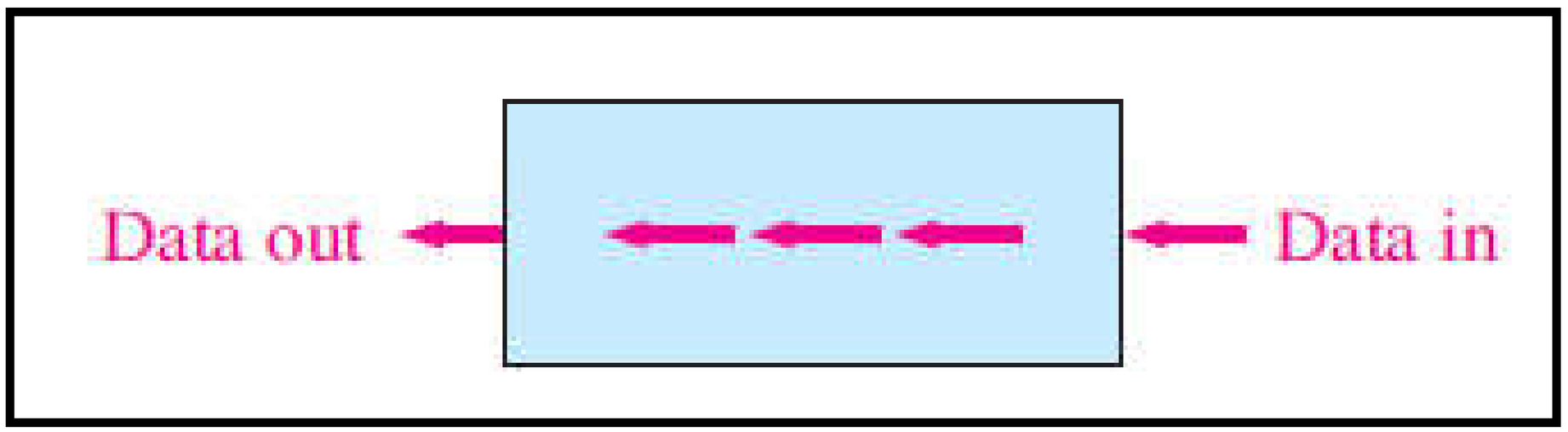
Working Concept

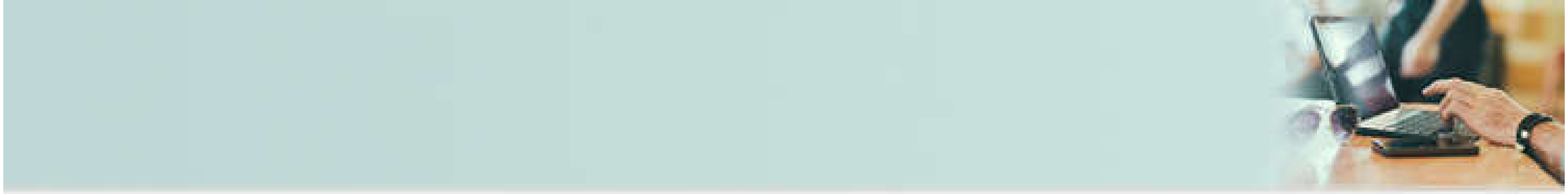


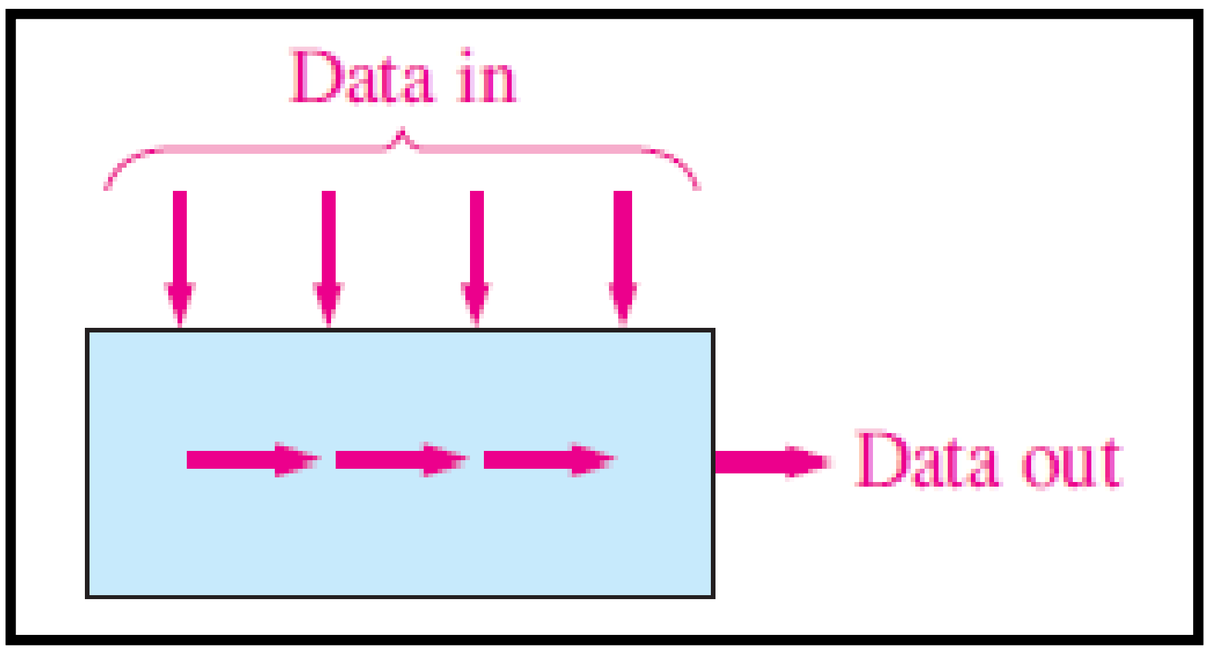


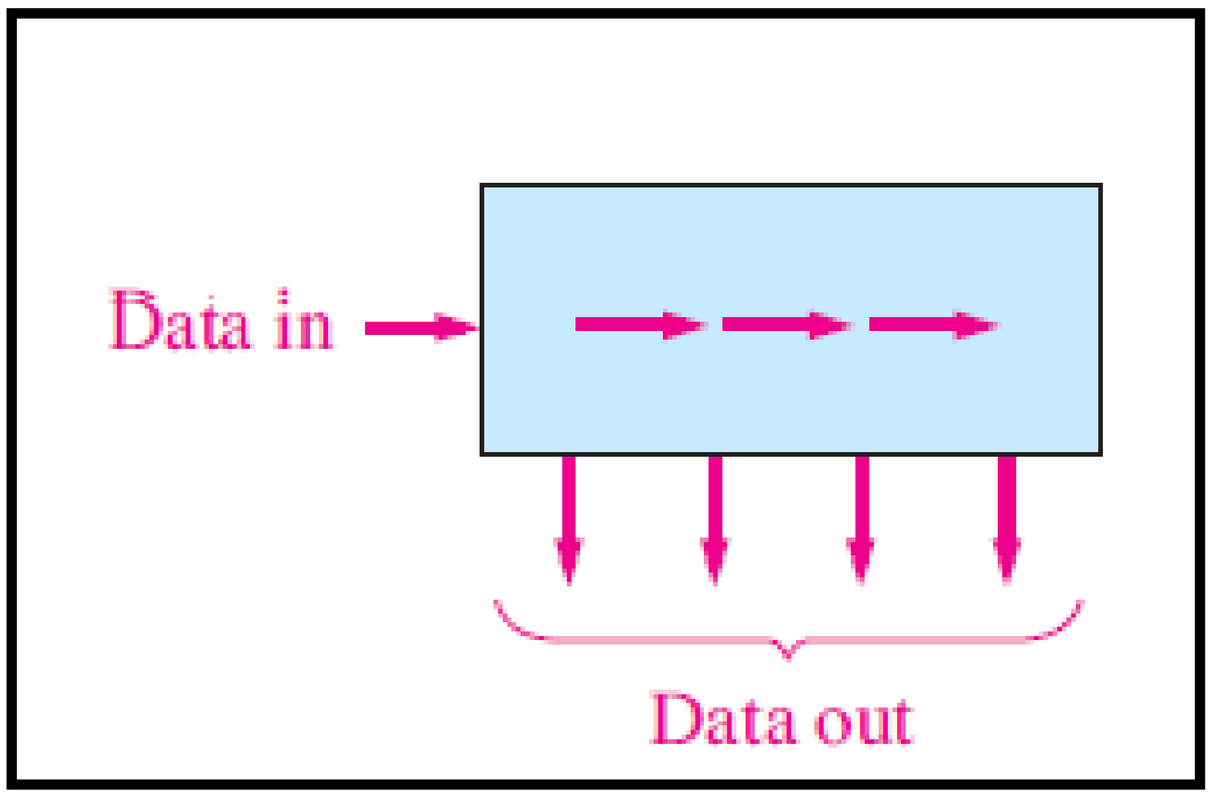
Another Perspective

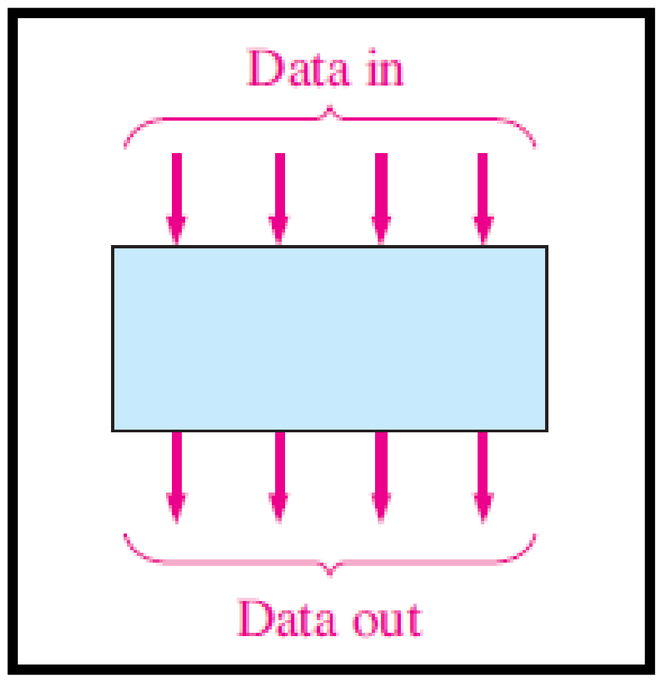


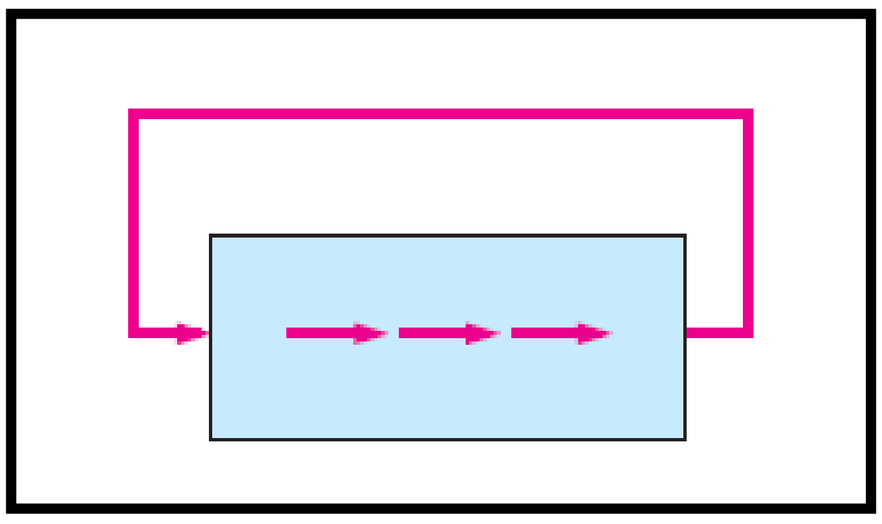


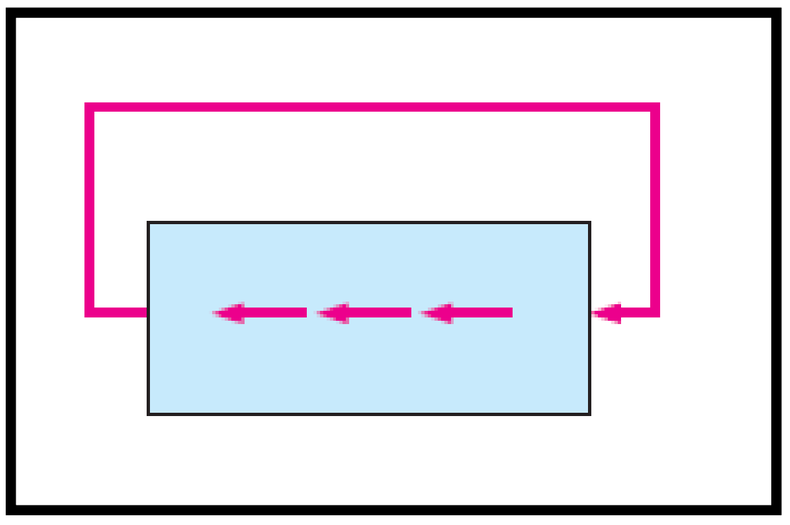



Data in
Data out

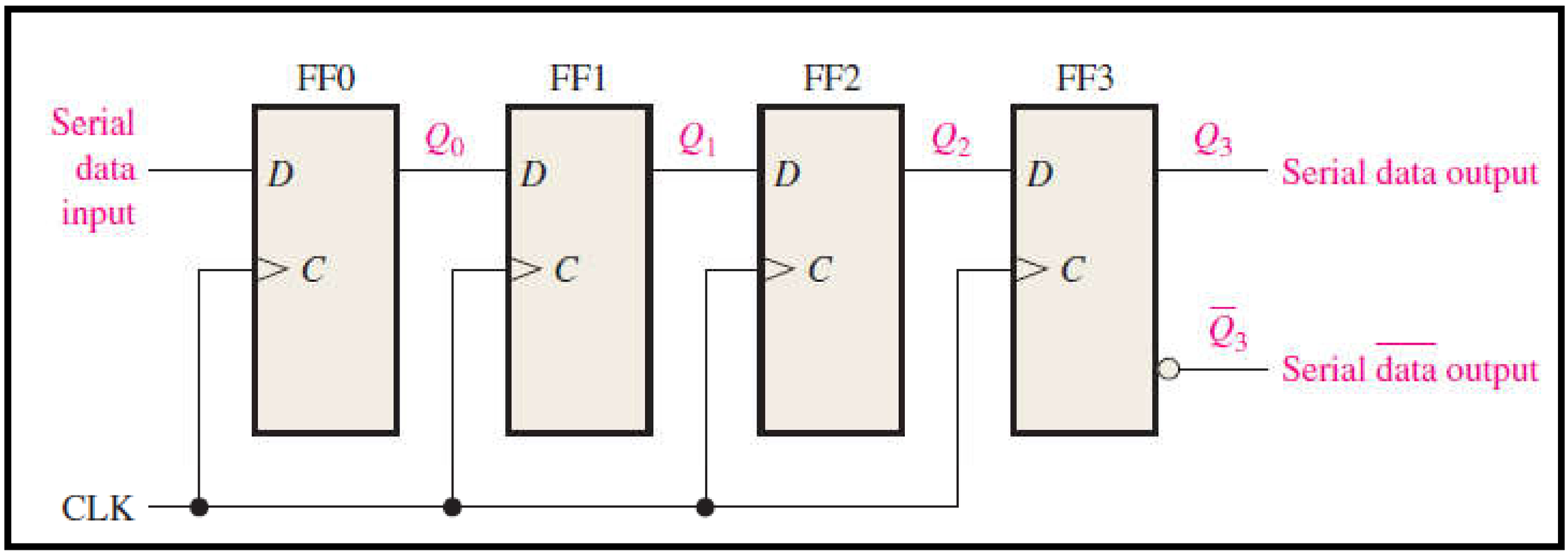

Data in
Data out


Data in
Data out





Serial In Serial Out



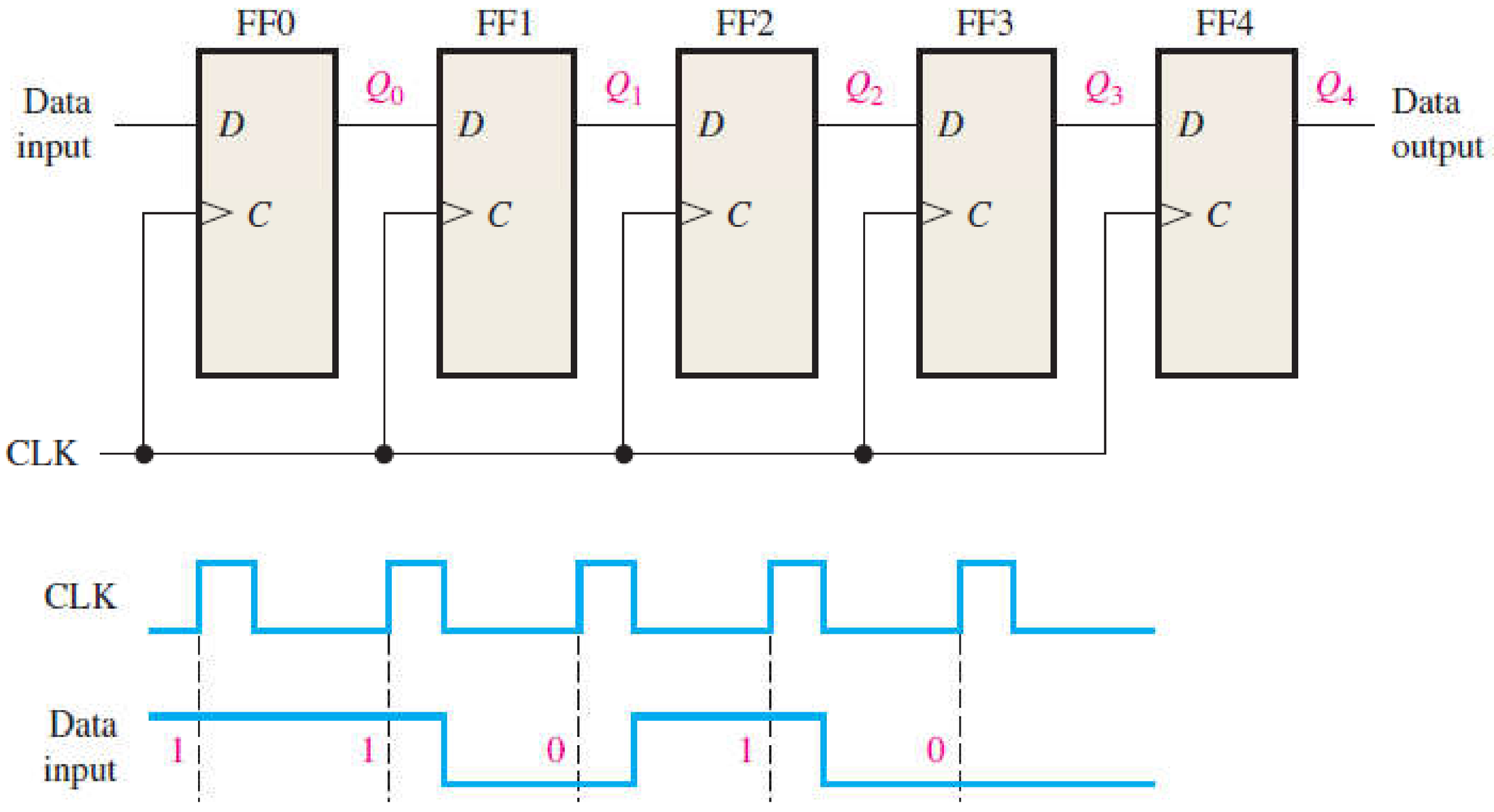
Bit Movement

CLK	FF0 (Q_0)	FF1 (Q_1)	FF2 (Q_2)	FF3 (Q_3)
Initial	0	0	0	0
1	**0**	0	0	0
2	**1**	**0**	0	0
3	**0**	**1**	**0**	0
4	**1**	**0**	**1**	**0**

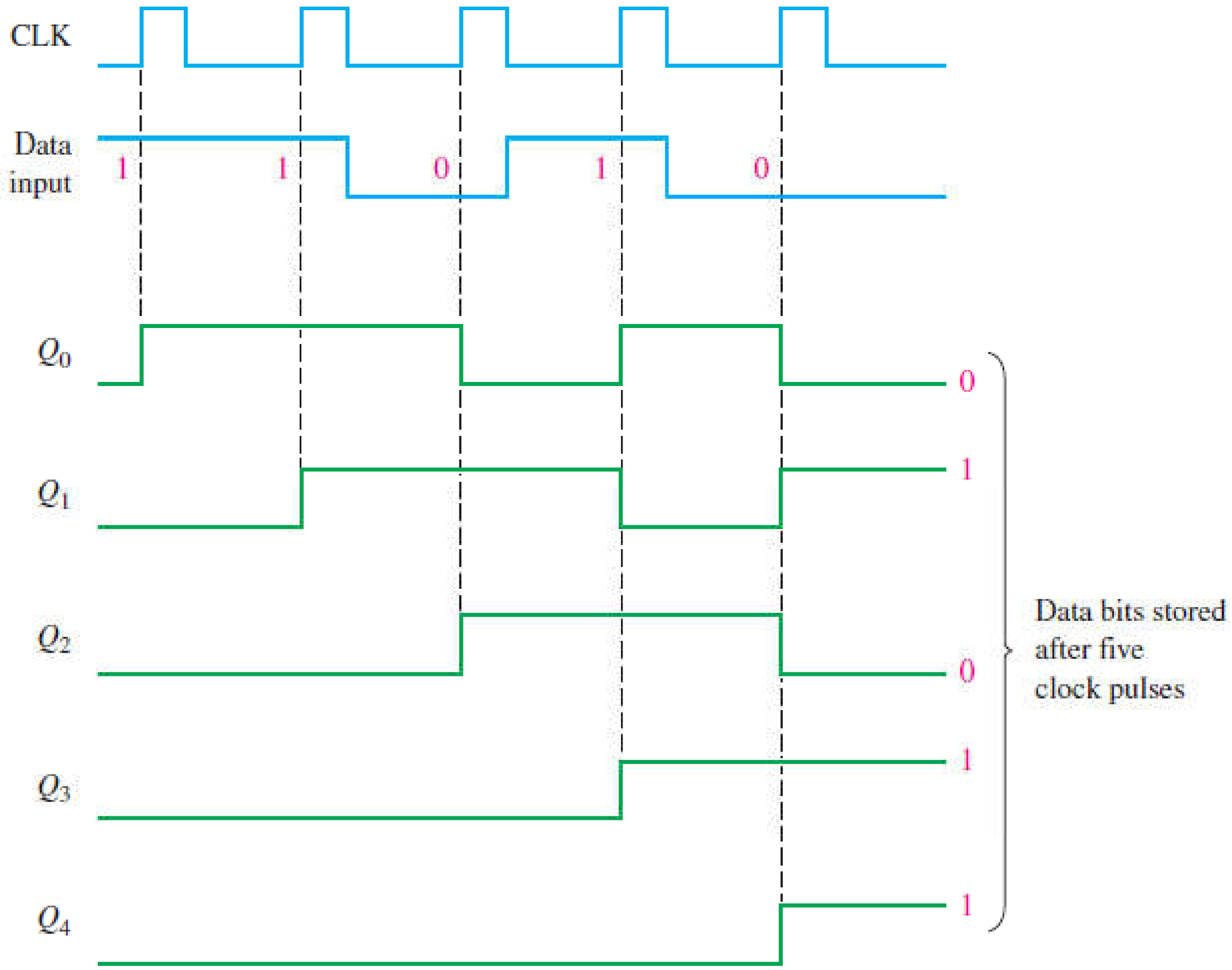
Bit Movement Cont..

CLK	FF0 (Q_0)	FF1 (Q_1)	FF2 (Q_2)	FF3 (Q_3)
Initial	**1**	**0**	**1**	**0**
5	0	**1**	**0**	**1**
6	0	0	**1**	**0**
7	0	0	0	**1**
8	0	0	0	0

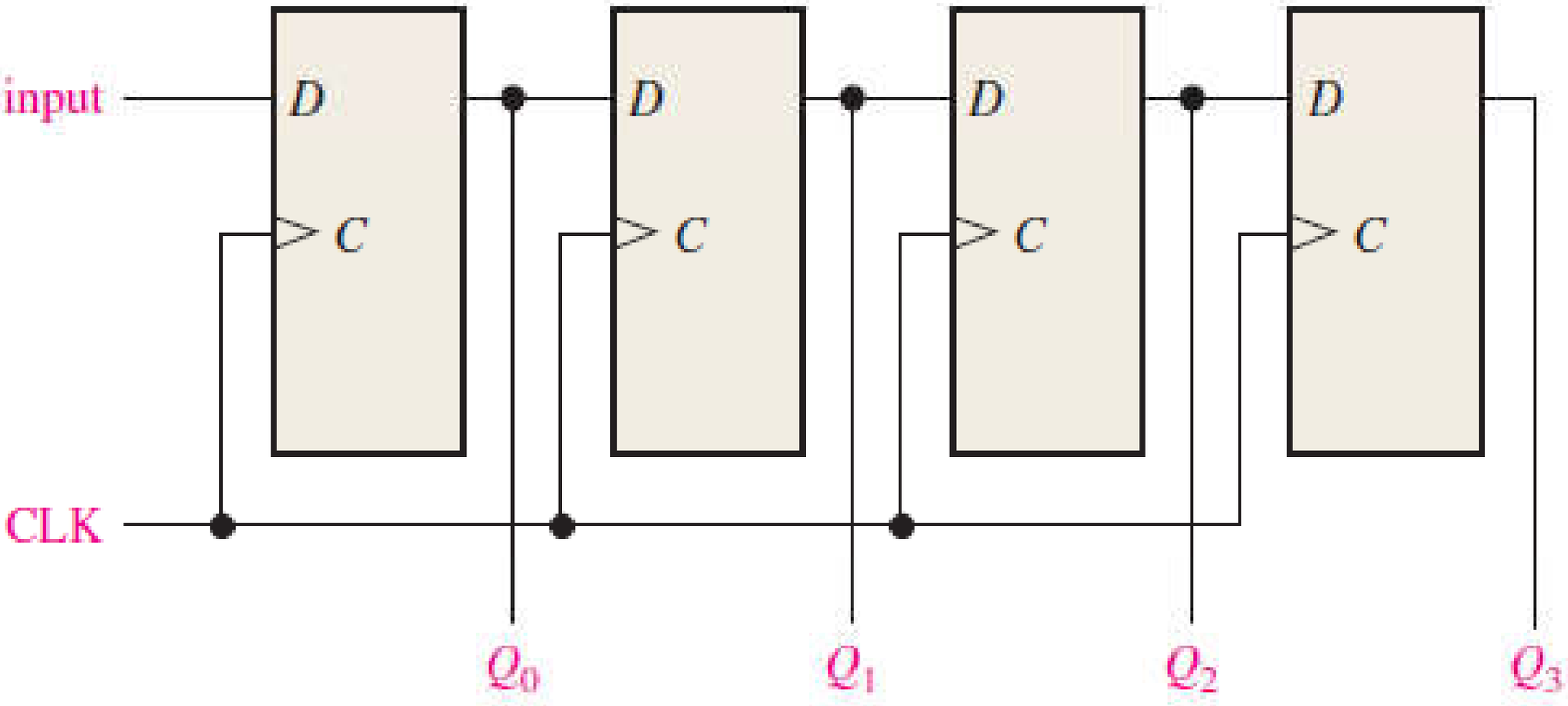
Concept Check



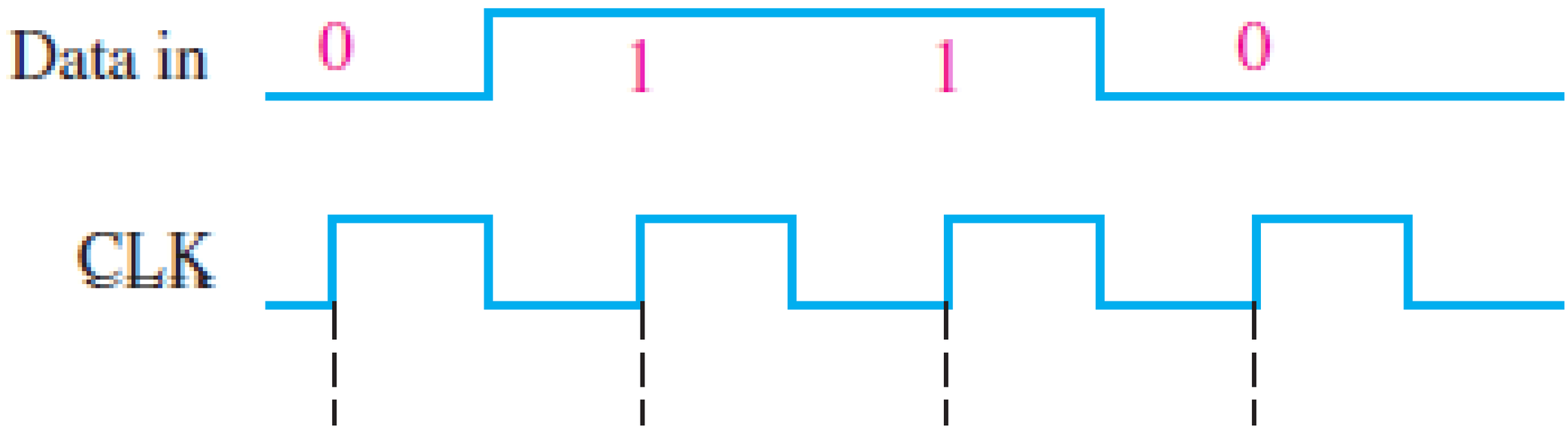
Solution


CLK
Data input
1
1
0
1
0
Q_0
0
Q_1
1
Q_2
0
Q_3
1
Q_4
1
Data bits stored after five clock pulses

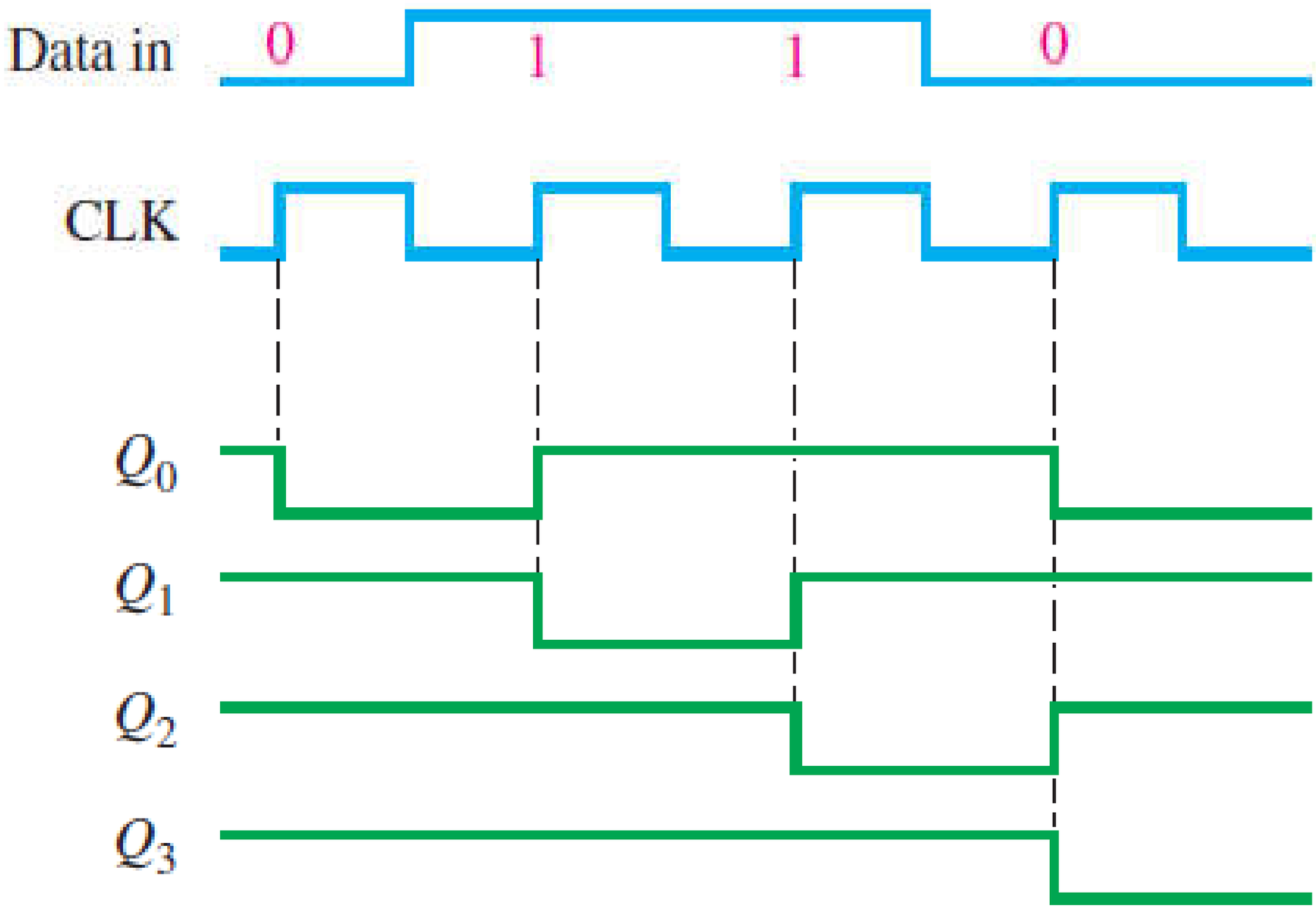
Serial In Parallel Out



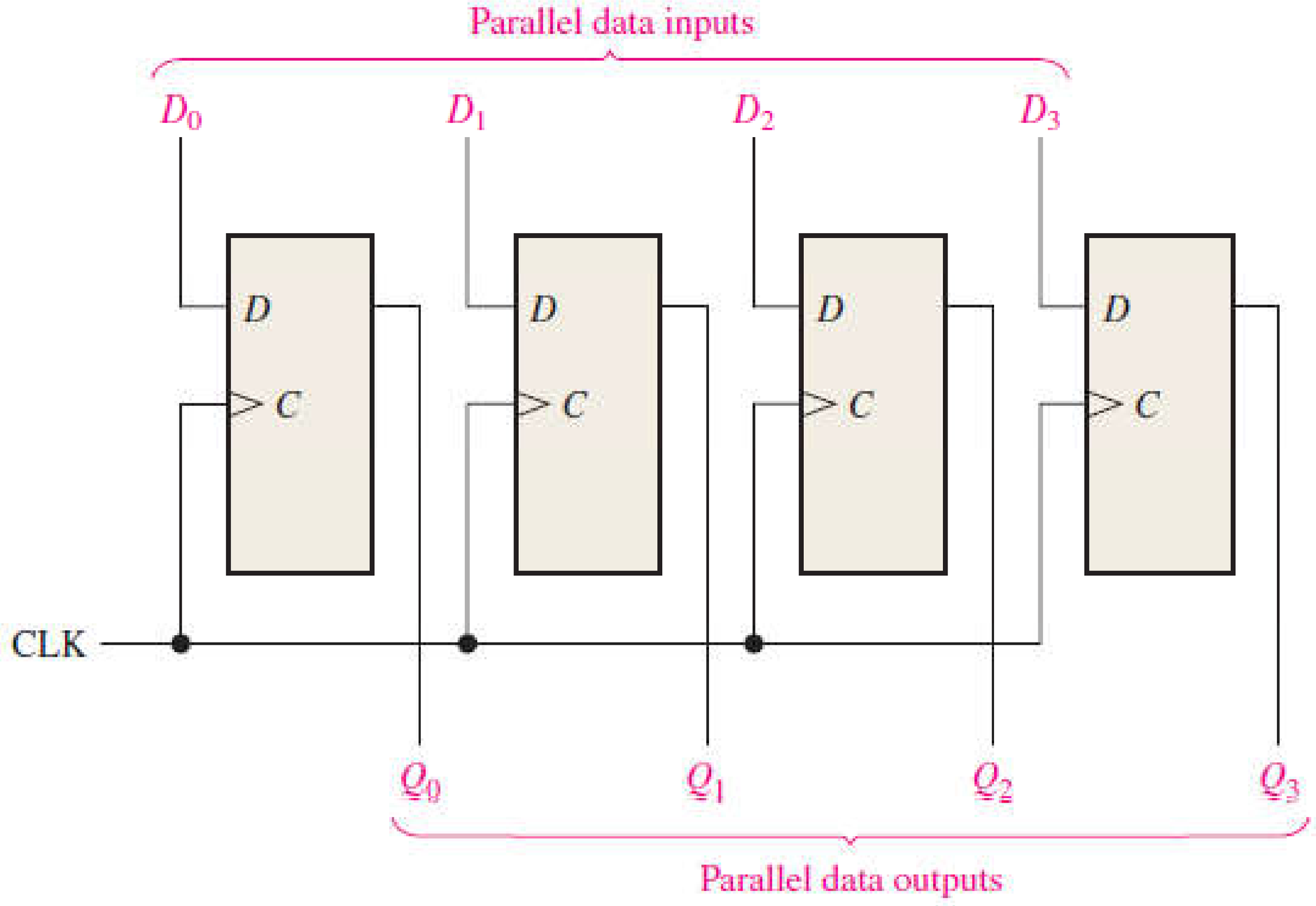
Concept Check



Solution



Parallel In Parallel Out



To B Continued...