

K-map

K-map for four variables

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		YZ			
		00	01	11	10
WX	00	0	0	0	0
	01	1	1	1	1
	11	1	1	1	1
	10	0	0	0	0

X

K-map

K-map for four variables
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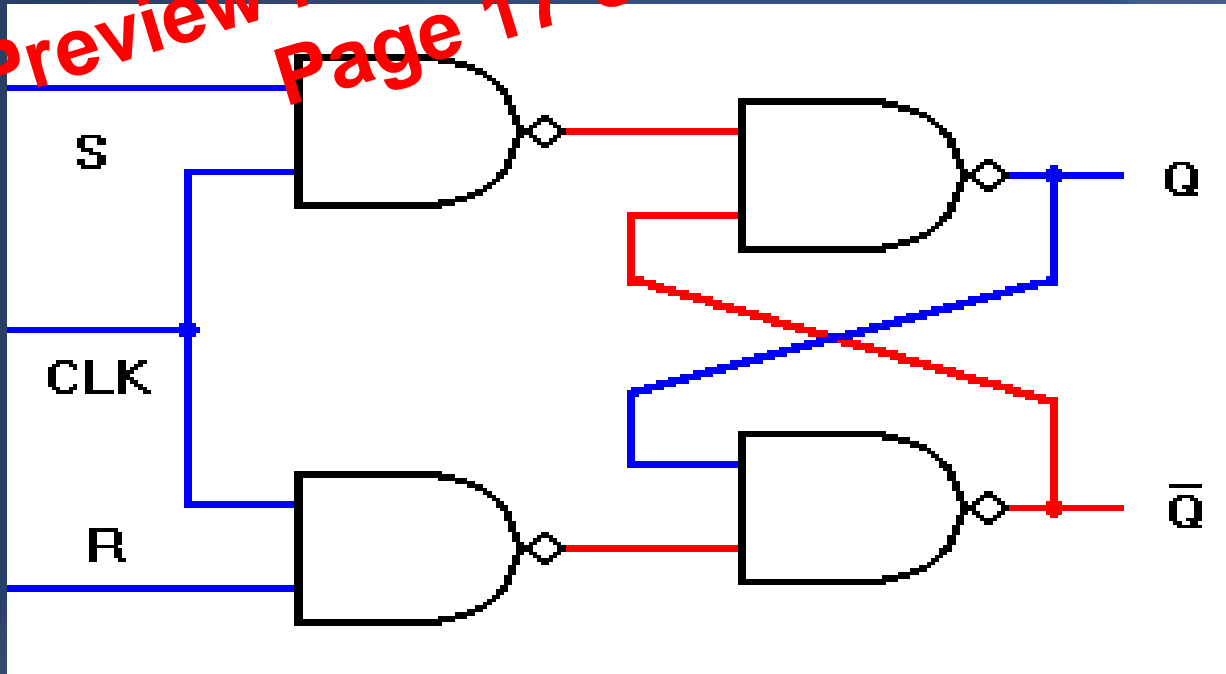
		YZ			
		00	01	11	10
WX	00	0	0	0	0
	01	0	1	1	1
	11	0	1	0	0
	10	0	1	0	0

$$WY'Z + W'XY + W'XZ$$

$$WY'Z + W'XY + XY'Z$$

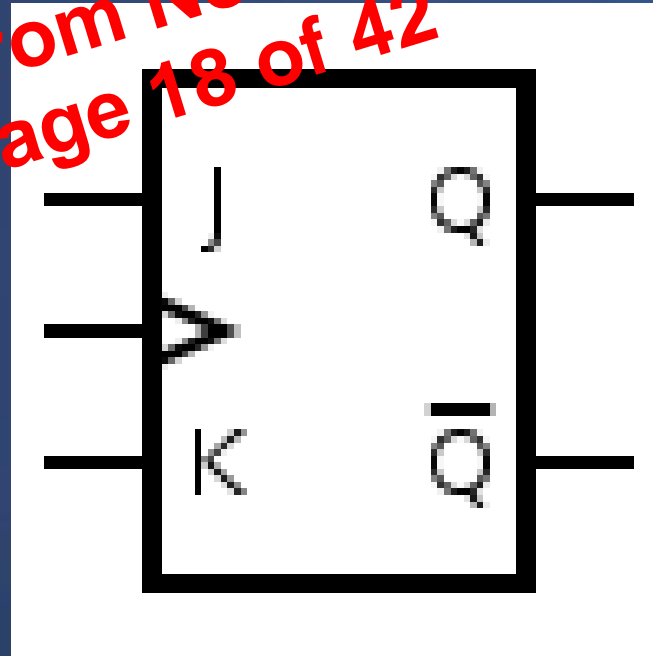
Clocked RS NAND latch

The clocked RS NAND latch is shown below :



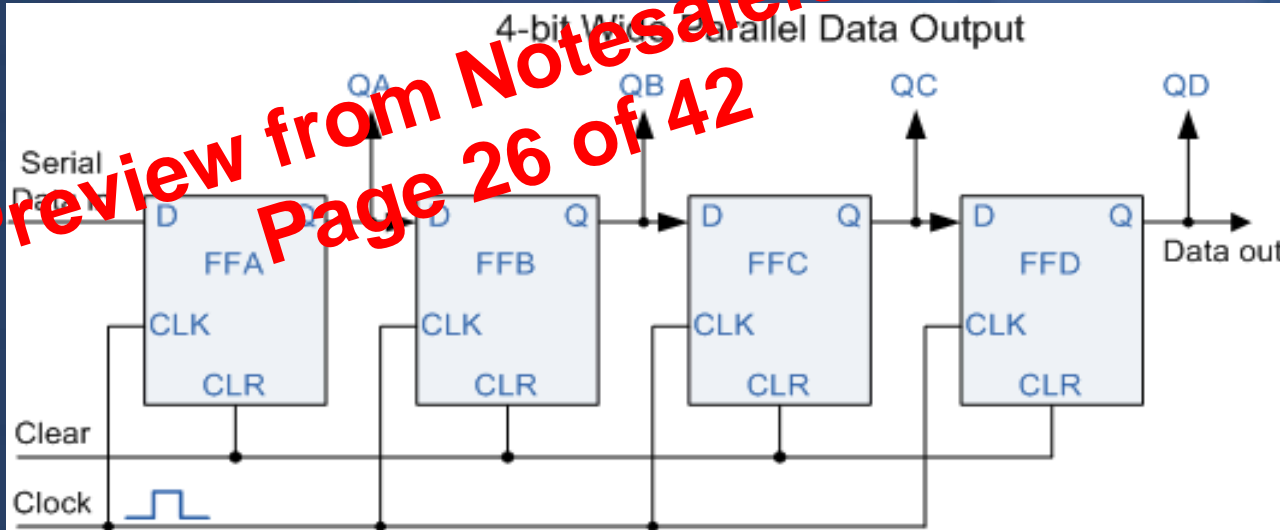
JK flip-flop

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Symbol of a positive edge triggered JK flip-flop

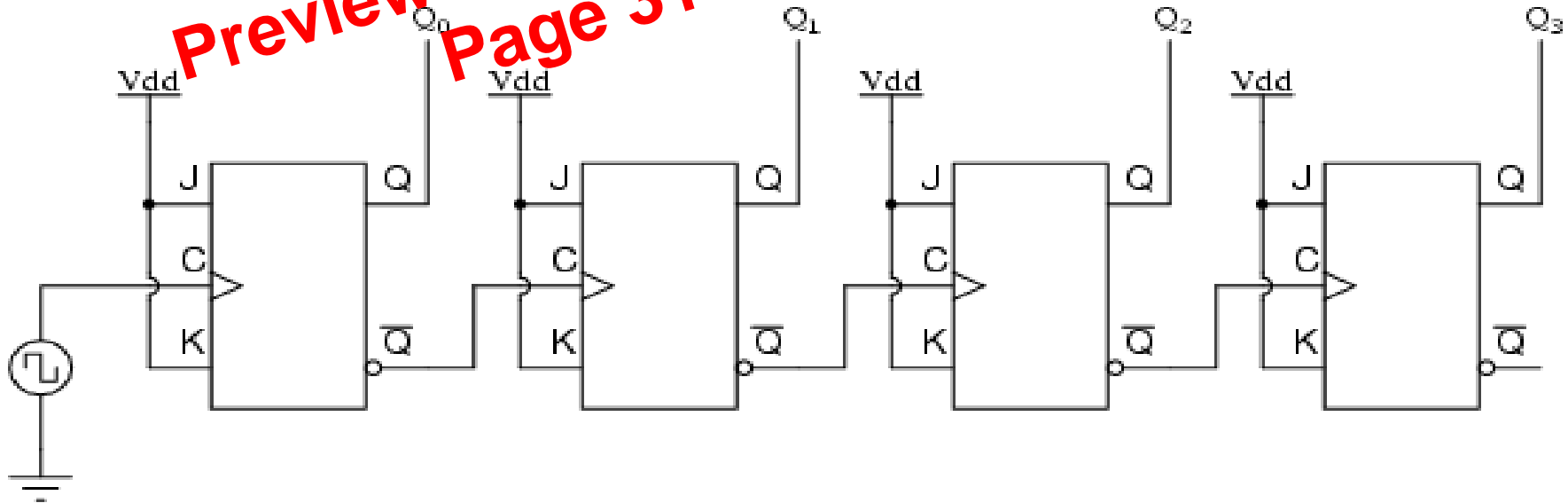
Serial-In to Parallel-Out (SIPO) shift register



4-bit serial-in to parallel-out (SIPO) shift register

Ripple or Asynchronous counter

A different way of making a four-bit "up" counter



Alternate method of realizing 4-bit ripple or asynchronous counter

Problems

K-map, maxterm solution

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Out = (A + B + C)
 Maxterm = $\overline{A} + \overline{B} + \overline{C}$
 Numeric = 1 1 1
 Complement = 0 0 0

		BC			
A		00	01	11	10
0		0	1	1	1
1		1	1	1	1

Out = $(\overline{A} + \overline{B} + \overline{C})$
 Maxterm = $\overline{A} + \overline{B} + \overline{C}$
 Numeric = 0 0 0
 Complement = 1 1 1

		BC			
A		00	01	11	10
0		1	1	1	1
1		1	1	0	1