K-map

K-map for four variables

WX \ YZ	00	01	11	10
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

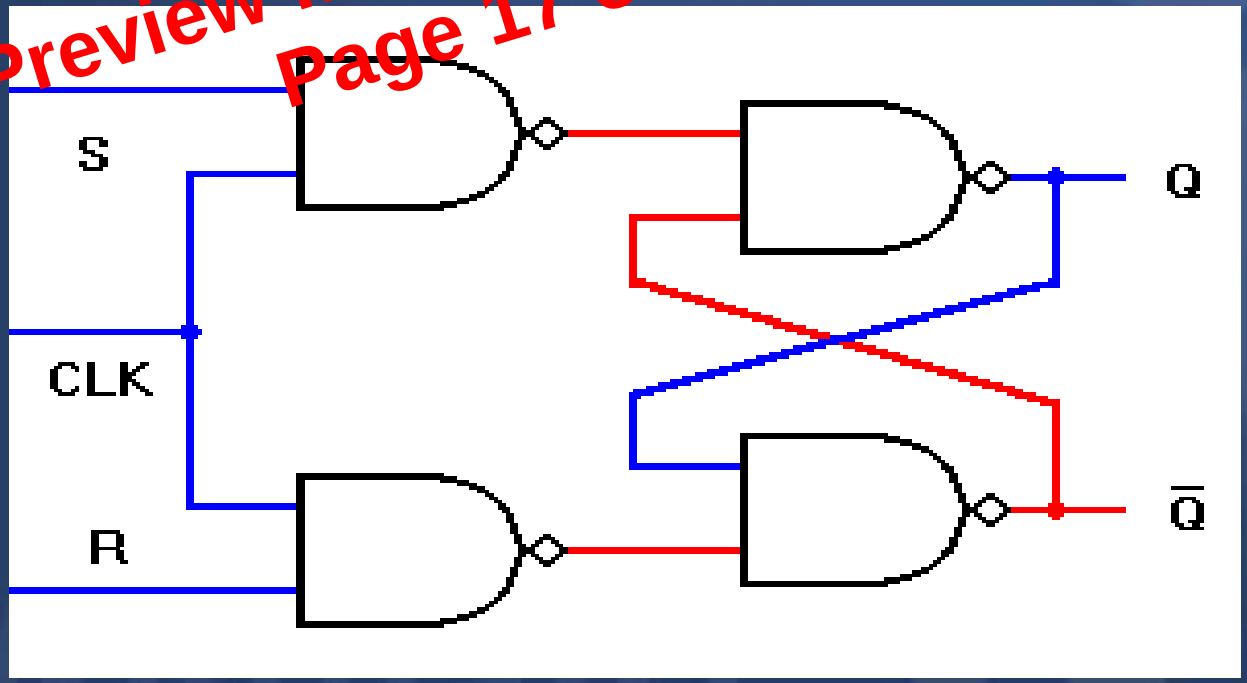
WX \ YZ	00	01	11	10
00	0	0	0	0
01	0	1	1	1
11	0	1	0	0
10	0	1	0	0

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

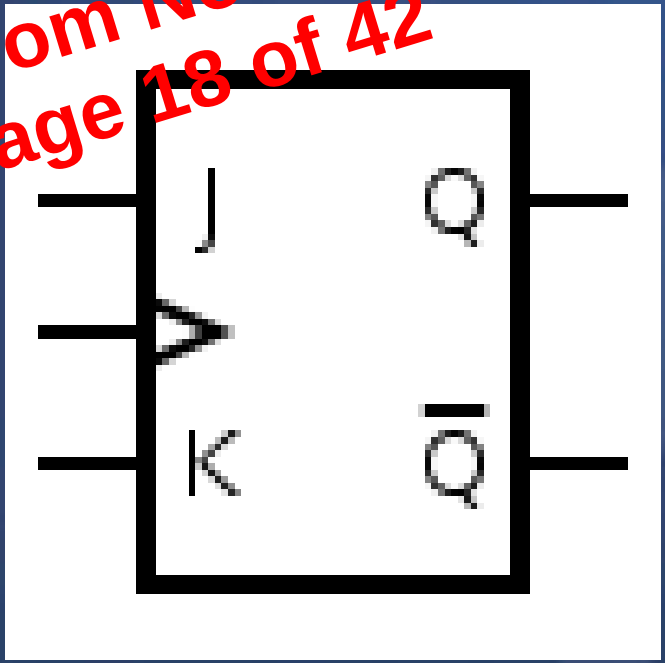
$$WY'Z + W'XY + XY'Z$$

Clocked RS NAND latch

The clocked RS NAND latch is shown below :

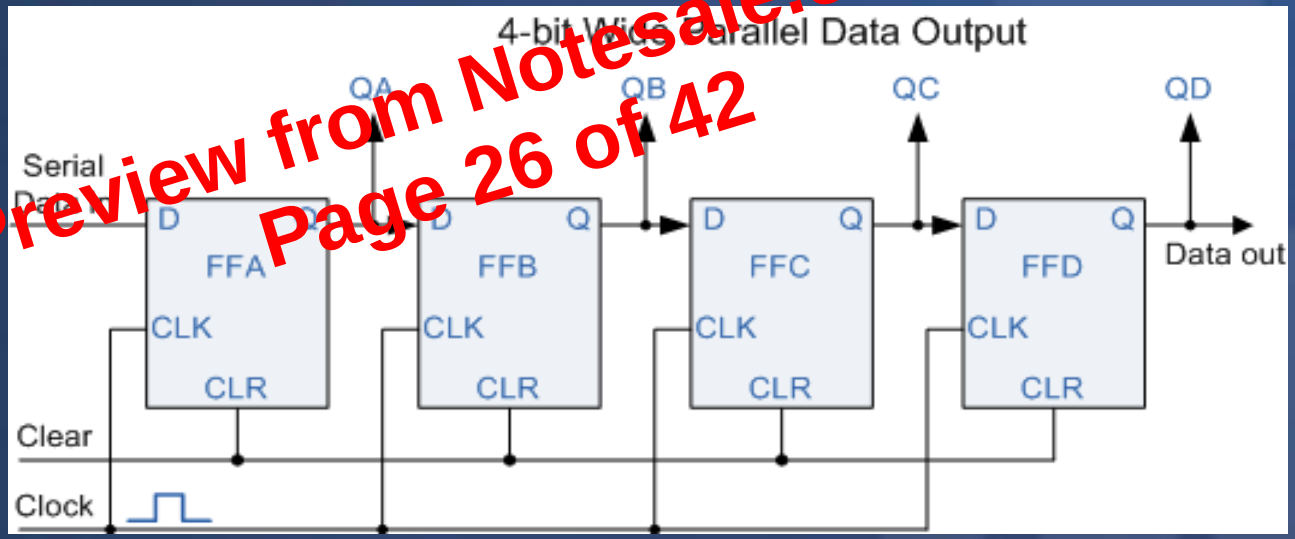


JK flip-flop



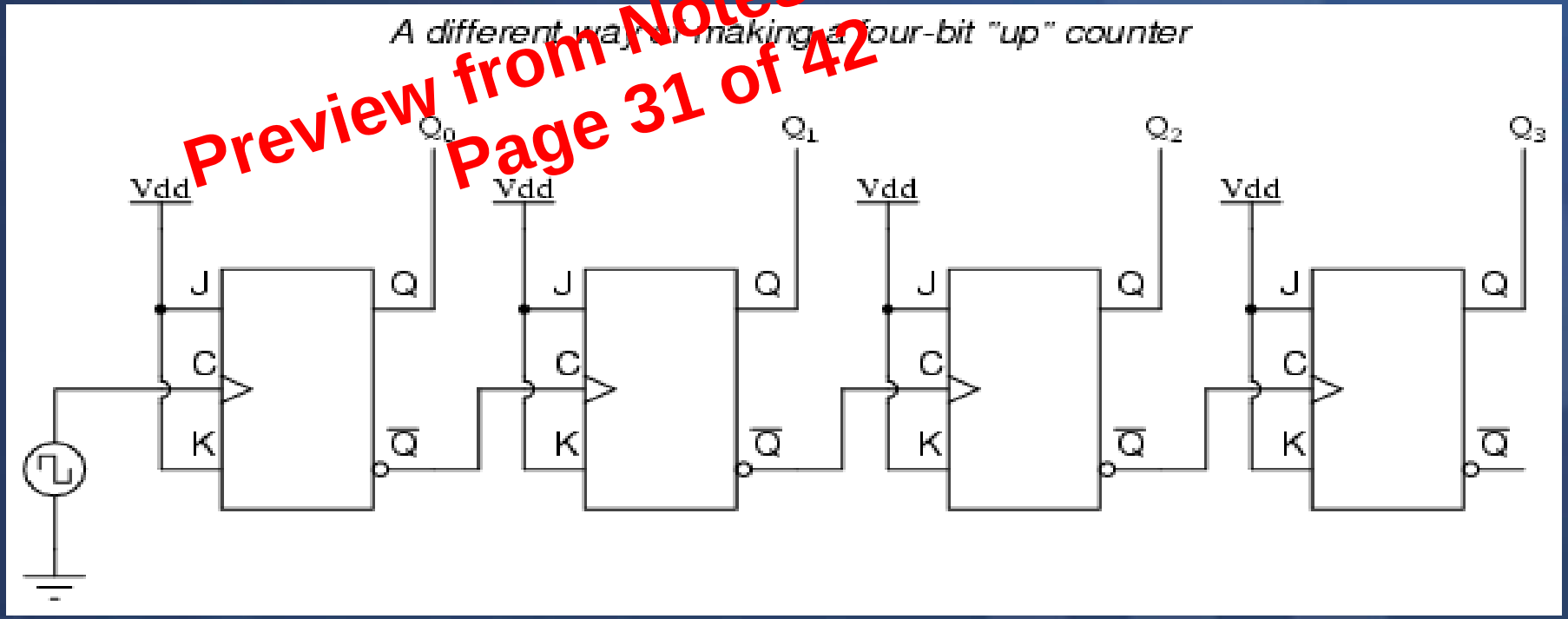
Symbol of a positive edge triggered JK flip-flop

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



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

Ripple or Asynchronous counter



Alternate method of realizing 4-bit ripple or asynchronous counter

Problems

K map, maxterm solution

Out = (A + B + C)
Maxterm = A + B + C
Numeric = 1 1 1
Complement = 0 0 0

A \ BC	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

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