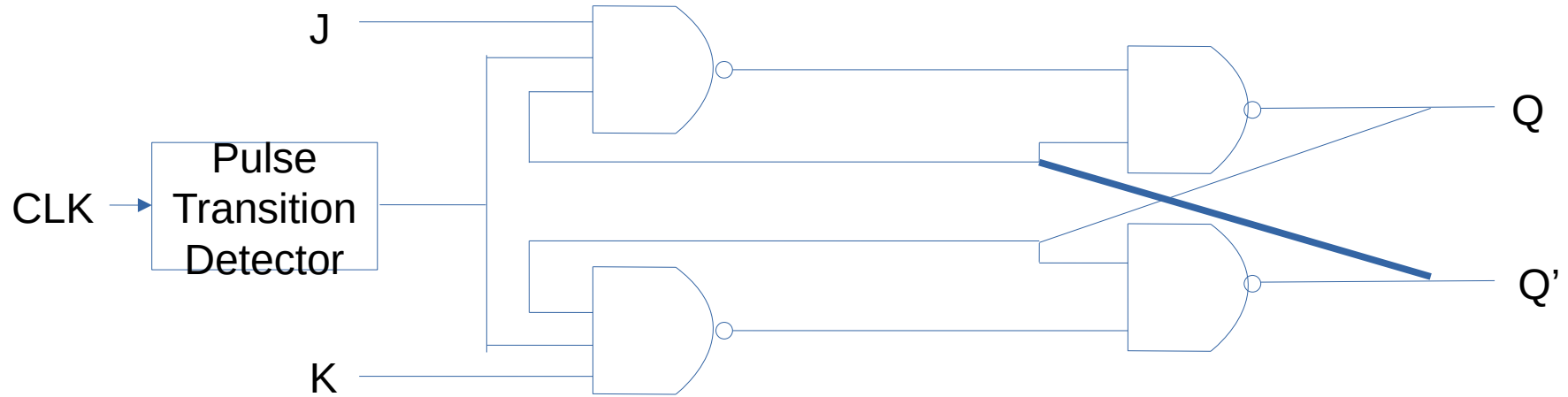


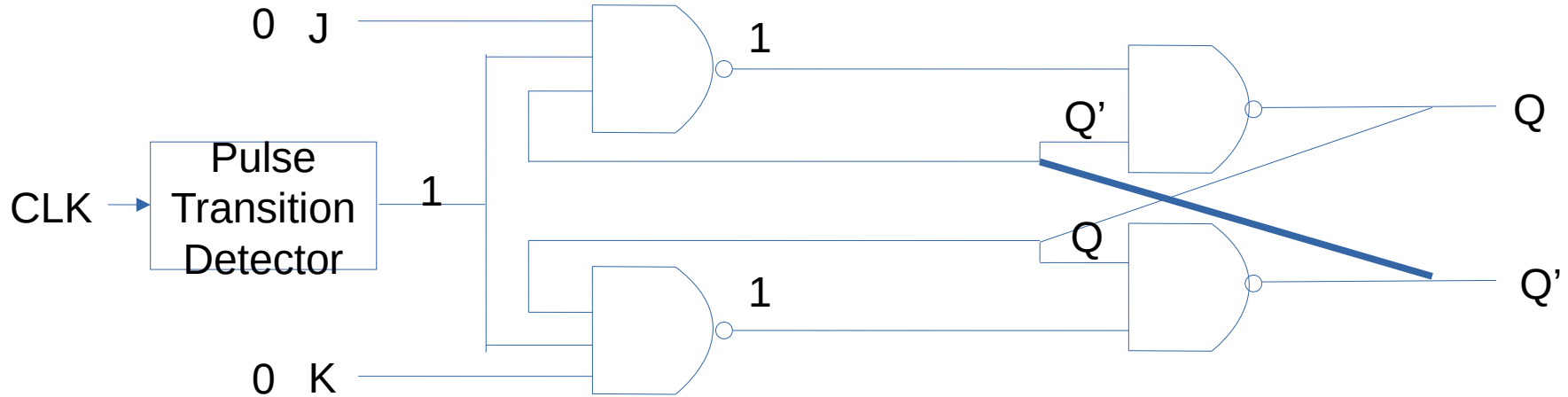
Switching Circuit & Logic Design

Lecture 22 : Flip-Flop

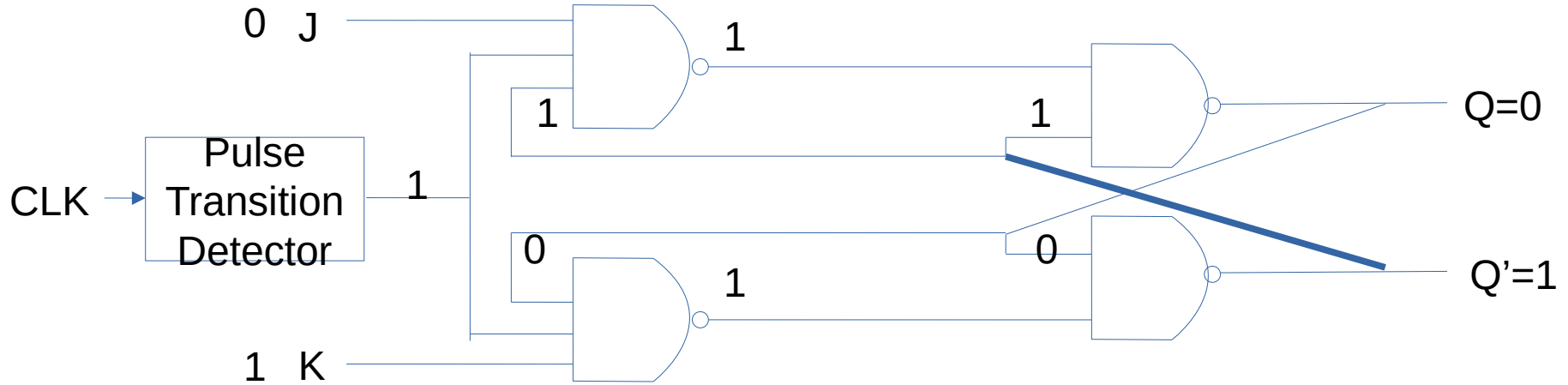
J-K Flip Flop



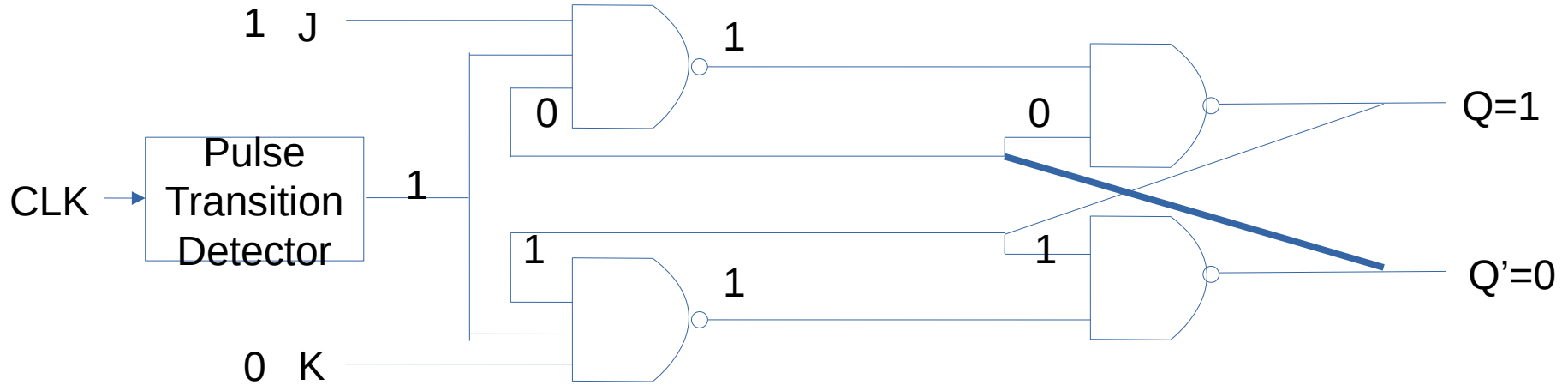
J-K Flip Flop



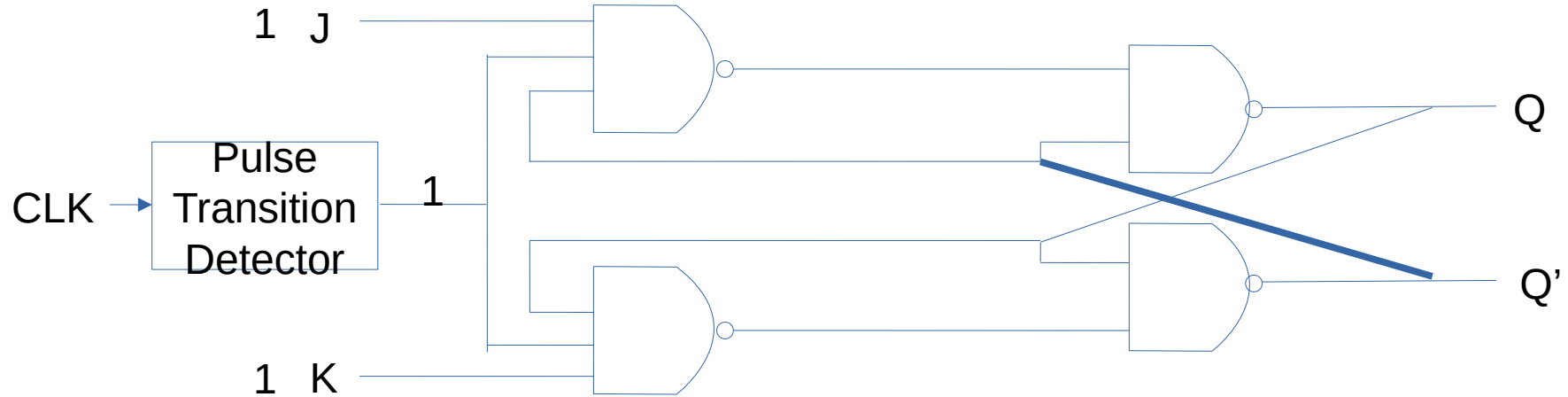
J-K Flip Flop



J-K Flip Flop

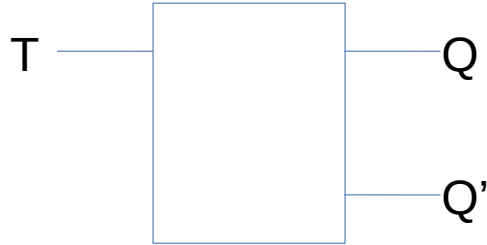


J-K Flip Flop



T Flip-Flop

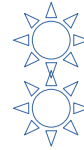
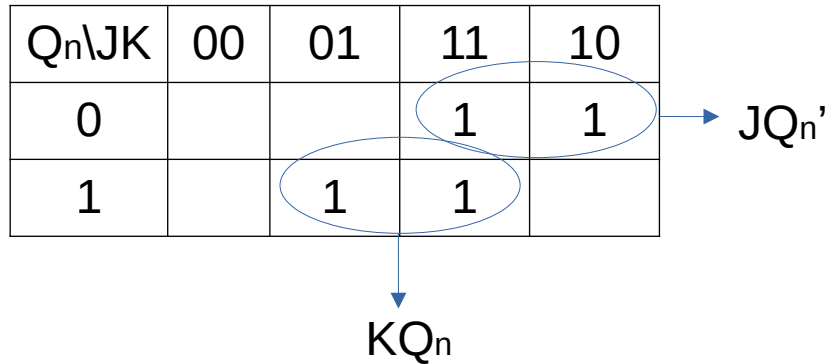
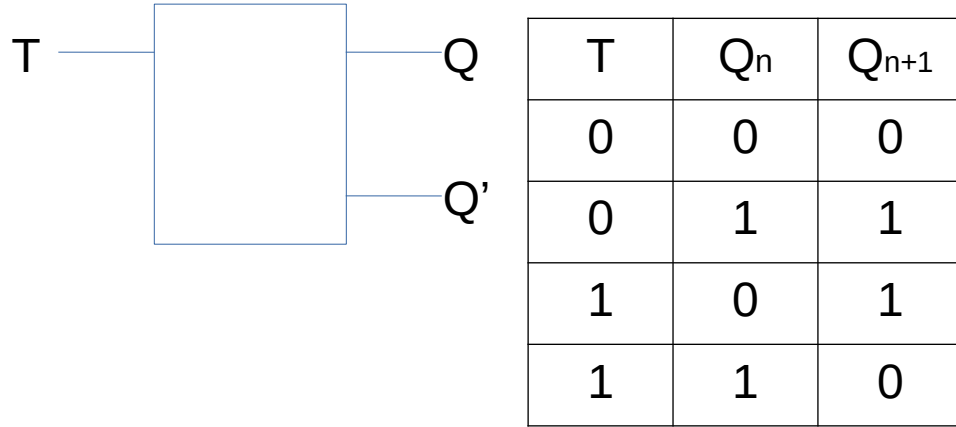
Convert T Flip-Flop to JK FF



T	Q_n	Q_{n+1}
0	0	0
0	1	1
1	0	1
1	1	0

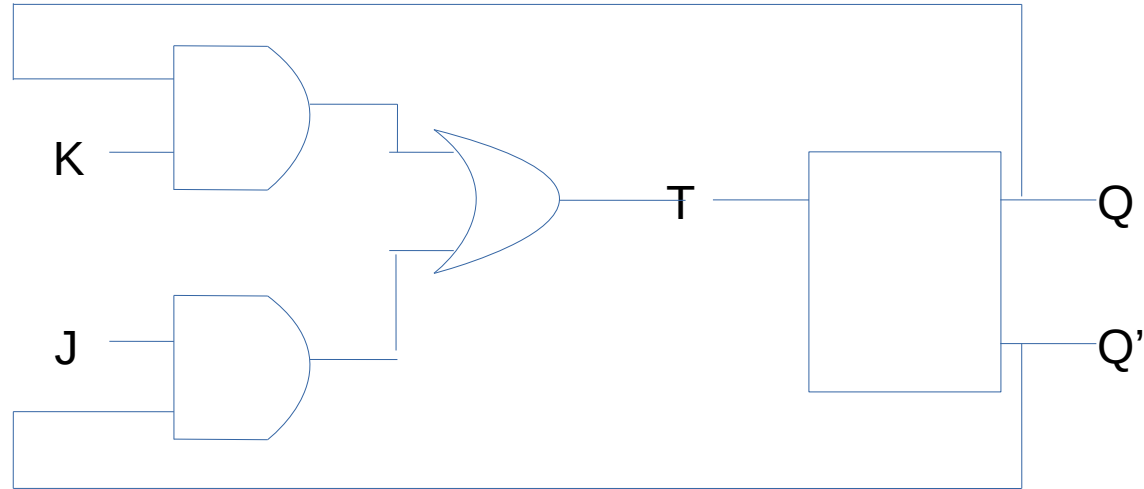
J	K	Q_n	Q_{n+1}
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	0

Convert T Flip-Flop to JK FF



J	K	Q_n	Q_{n+1}	T
0	0	0	0	0
0	0	1	1	0
0	1	0	0	0
0	1	1	0	1
1	0	0	1	1
1	0	1	1	0
1	1	0	1	1
1	1	1	0	1

Convert T Flip-Flop to JK FF



Steps For conversion: A FF to B FF

Write Truth tables like this for both A & B Flip-flops.

A	Q_n	Q_{n+1}

B	Q_n	Q_{n+1}

Steps For conversion: A FF to B FF

Now insert another column(s)
at B FF Truth table

A	Q_n	Q_{n+1}
	0	1

B	Q_n	Q_{n+1}	A
	0	1	

Fill up this column(s) as above.

1. Look at the transition from Q_n to Q_{n+1} .
2. Find the A input(s) for this required transition.
3. Place this input(s) at column A of B FF.

Steps For conversion: A FF to B FF

Now build a K-map to realize
 $A = f(B, Q_n)$

B	Q_n	Q_{n+1}	A