

Johnson Counter

It is an example of synchronous counter. In the counter, the complemented output of last flip flop is connected to input of first flip flop and to implement 8-bit Johnson counter we require 8 flip-flops. It is one of the most important type of shift register counter. It is formed by the feedback of the output to its own input. Johnson Counter is a ring with an inversion.

In our 8-bit Johnson counter, the number of used states = 16

number of unused states = 240 (ie $2^8 - 16$)
assuming reset = 0

Truth Table

(CP) Clock Period	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0
2	1	1	0	0	0	0	0	0
3	1	1	1	0	0	0	0	0
4	1	1	1	1	0	0	0	0
5	1	1	1	1	1	0	0	0
6	1	1	1	1	1	1	0	0
7	1	1	1	1	1	1	1	0
8	1	1	1	1	1	1	1	1
9	0	1	1	1	1	1	1	1
10	0	0	1	1	1	1	1	1
11	0	0	0	1	1	1	1	1
12	0	0	0	0	1	1	1	1
13	0	0	0	0	0	1	1	1
14	0	0	0	0	0	0	1	1
15	0	0	0	0	0	0	0	1
16	0	0	0	0	0	0	0	0

8 BIT JOHNSON COUNTER

CIRCUIT DIAGRAM

