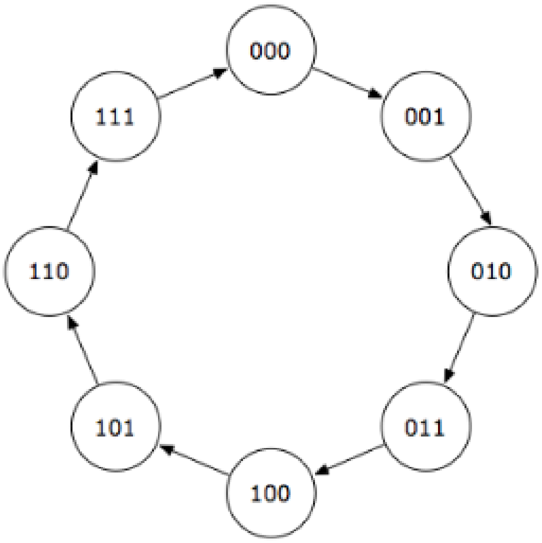
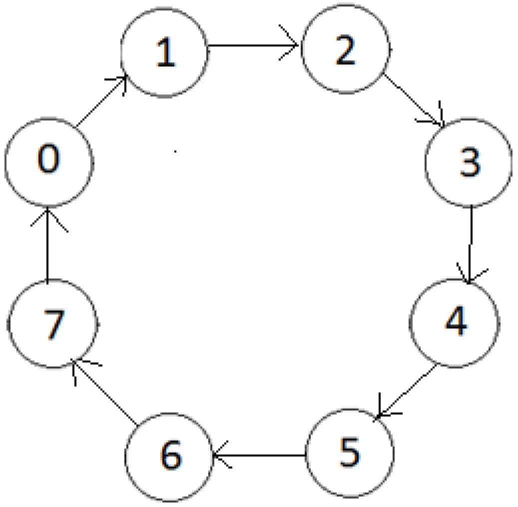
FSM (8 STATES).
SYNCHRONE 8-TELLER MET D-FF





Given is the FSM with 8 states. This is a synchronous counter. The systems has no inputs (except for the clock and probably an asynchronous reset. At each active edge it goes to the next state. The systems is realized with 3 D flip-flops, Q_2, Q_1 and Q_0. (De flfip-flop outputs are also the outputs of the systems).

Determine the Boolean equations for the combinational logic for the data inputs of these flip-flops.

Ontwerp een synchrone 8-teller met D-FF

Excitatietabel D-FF		
Q_n	Q_{n+1}	D_n
0	0	0
0	1	1
1	0	0
1	1	1

Volgordetabel synchrone 8-teller met 3 D-FF (Excitatietabel)										
Voor de klokpuls Q_n				Na de klokpuls Q_{n+1}				D-ingang		
decimaal	C_n	B_n	A_n	C_{n+1}	B_{n+1}	A_{n+1}	decimaal	D_{Cn}	D_{Bn}	D_{An}
0	0	0	0	0	0	1	1	0	0	1
1	0	0	1	0	1	0	2	0	1	0
2	0	1	0	0	1	1	3	0	1	1
3	0	1	1	1	0	0	4	1	0	0
4	1	0	0	1	0	1	5	1	0	1
5	1	0	1	1	1	0	6	1	1	0
6	1	1	0	1	1	1	7	1	1	1
7	1	1	1	0	0	0	0	0	0	0

D_{Cn}

C \ B A	00	01	11	10
0	0	0	1	0
1	1	1	0	1

D_{Bn}

C \ B A	00	01	11	10
0	0	1	0	1
1	0	1	0	1

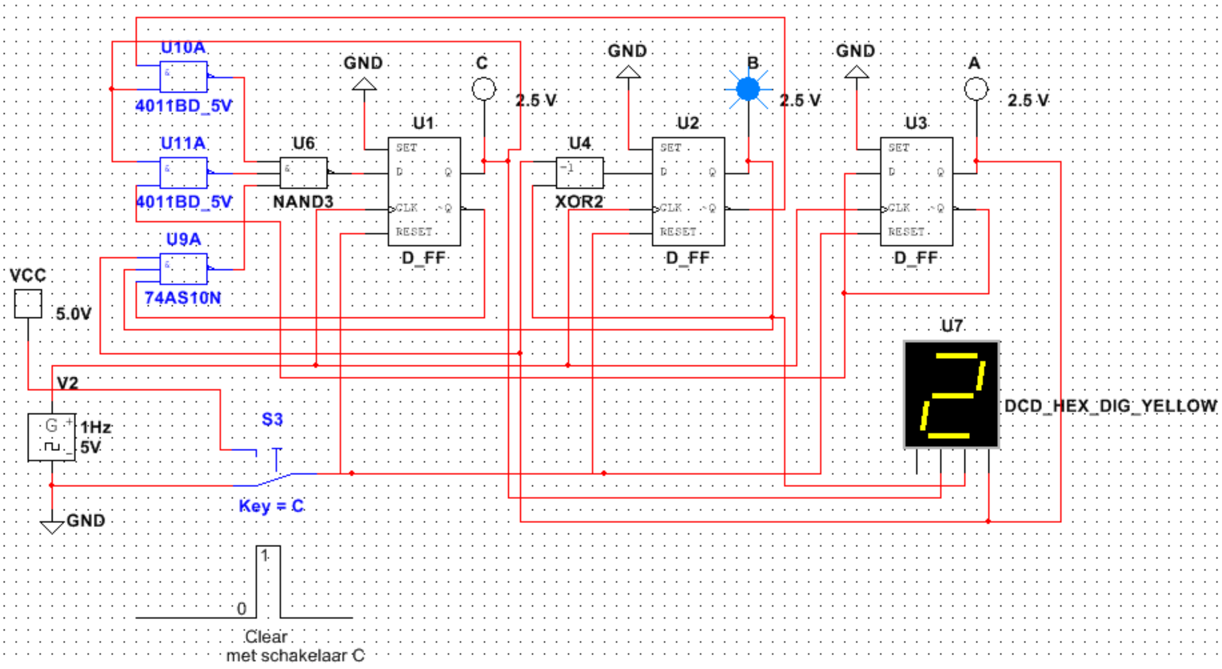
D_{An}

C \ B A	00	01	11	10
0	1	0	0	1
1	1	0	0	1

$$D_{Cn} = C\bar{B} + C\bar{A} + AB\bar{C}$$

$$D_{Bn} = A\bar{B} + \bar{A}B = A \oplus B \;= (XOR)$$

$$D_{An} = \bar{A}$$



Ontwerp een synchrone 8-teller met D-FF

	00	01	11	10
0				
1				

	00	01	11	10
0				
1				

	00	01	11	10
0				
1				

	00	01	11	10
0				
1				

	00	01	11	10
0				
1				

	00	01	11	10
0				
1				

	00	01	11	10
00				
01				
11				
10				

	00	01	11	10
00				
01				
11				
10				

	00	01	11	10
00				
01				
11				
10				

	00	01	11	10
00				
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11				
10				

	00	01	11	10
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	00	01	11	10
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	00	01	11	10
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	00	01	11	10
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01				
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	00	01	11	10
00				
01				
11				
10				