Sistemas Digitais

Trabalho 1 - Contador Gray (4 bits)

J	K	Q
0	0	Qa
0	1	0
1	0	1
1	1	~Qa

Atual	Próx.	J	K
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

Estado atual				Próx. estado				Flip-Flops							
Q_3	Q_2	Q_1	Q_0	Q_3	Q_2	Q_1	Q_0	JQ_3	KQ_3	JQ_2	KQ_2	JQ_1	KQ_1	JQ_0	KQ_0
0	0	0	0	0	0	0	1	0	X	0	X	0	X	1	X
0	0	0	1	0	0	1	1	0	X	0	X	1	X	X	0
0	0	1	0	0	1	1	0	0	X	1	X	X	0	0	X
0	0	1	1	0	0	1	0	0	X	0	X	X	0	X	1
0	1	0	0	1	1	0	0	1	X	X	0	0	X	0	X
0	1	0	1	0	1	0	0	0	X	X	0	0	X	X	1
0	1	1	0	0	1	1	1	0	X	X	0	X	0	1	X
0	1	1	1	0	1	0	1	0	X	X	0	X	1	X	0
1	0	0	0	0	0	0	0	X	1	0	X	0	X	0	X
1	0	0	1	1	0	0	0	X	0	0	X	0	X	X	1
1	0	1	0	1	0	1	1	X	0	0	X	X	0	1	X
1	0	1	1	1	0	0	1	X	0	0	X	X	1	X	0
1	1	0	0	1	1	0	1	X	0	X	0	0	X	1	X
1	1	0	1	1	1	1	1	X	0	X	0	1	X	X	0
1	1	1	0	1	0	1	0	X	0	X	1	X	0	0	X
1	1	1	1	1	1	1	0	X	0	X	0	X	0	X	1

Tabela Grey

					Grey			
0	0	0	0		0	0	0	0
0	0	0	1		0	0	0	1
0	0	1	0		0	0	1	1
0	0	1	1		0	0	1	0
0	1	0	0		0	1	1	0
0	1	0	1		0	1	1	1
0	1	1	0		0	1	0	1
0	1	1	1		0	1	0	0
1	0	0	0		1	1	0	0
1	0	0	1		1	1	0	1
1	0	1	0		1	1	1	1
1	0	1	1		1	1	1	0
1	1	0	0		1	0	1	0
1	1	0	1		1	0	1	1
1	1	1	0		1	0	0	1
1	1	1	1		1	0	0	0

$JQ_3 = Q_0' Q_1' Q_2$

Q_0Q_1 \ Q_2Q_3	00	01	11	10
00	0	X	X	1
01	0	X	X	0
11	0	X	X	0
10	0	X	X	0

$JK_3 = Q_0' Q_1' Q_2'$

Q_0Q_1 \ Q_2Q_3	00	01	11	10
00	X	1	0	X
01	X	0	0	X
11	X	0	0	X
10	X	0	0	X

tilibra

$$JQ_2 = \dot{Q_0} Q_1' Q_3'$$

Q_0 \ Q_1 \ $Q_2 Q_3$	00	01	11	10
00	0	0	X	X
01	0	0	X	X
11	0	0	X	X
10	1	0	X	X

$$KQ_2 = Q_0' Q_1 Q_3$$

Q_0 \ Q_1 \ $Q_2 Q_3$	00	01	11	10
00	X	X	0	0
01	X	X	1	0
11	X	X	0	0
10	X	X	0	0

$$JQ_1 = (Q_0 Q_2' Q_3') + (Q_0 Q_2 Q_3)$$

Q_0 \ Q_1 \ $Q_2 Q_3$	00	01	11	10
00	0	0	0	0
01	X	X	X	X
11	X	X	X	X
10	1	0	1	0

$$KQ_1 = (Q_0 Q_2 Q_3') + (Q_0 Q_2' Q_3)$$

Q_0 \ Q_1 \ $Q_2 Q_3$	00	01	11	10
00	X	X	X	X
01	0	0	0	0
11	0	1	0	1
10	X	X	X	X

Q_0 \ Q_1 \ $Q_2 Q_3$	00	01	11	10
00	1	0	1	0
01	0	1	0	1
11	X	X	X	X
10	X	X	X	X

Q_0 \ Q_1 \ $Q_2 Q_3$	00	01	11	10
00	X	X	X	X
01	X	X	X	X
11	1	0	1	0
10	0	1	0	1

$$JQ_0 = (Q_1' Q_2' Q_3') + (Q_1 Q_2' Q_3) + (Q_1' Q_2 Q_3) + (Q_1 Q_2 Q_3)$$

$$JK_0 = (Q_1 Q_2' Q_3') + (Q_1' Q_2' Q_3) + (Q_1 Q_2 Q_3) + (Q_1' Q_2 Q_3')$$