Sequential Part Assignment

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Counter Using T Flip Flop

Counts :
0 to 6 (Since,in combinational part 111(7) is set for Don't care)
: 000-001-010-011-100-101-110-Repeat(000)

Current State			Next State			T Flip Flop Outputs		
Q_C	Q_B	Q_A	Q_{CN}	Q_{BN}	Q_{AN}	T_A	T_B	T_C
0	0	0	0	0	1	1	0	0
0	0	1	0	1	0	1	1	0
0	1	0	0	1	1	1	0	0
0	1	1	1	0	0	1	1	1
1	0	0	1	0	1	1	0	0
1	0	1	1	1	0	1	1	0
1	1	0	0	0	0	1	0	1

K-Maps :

T_A:

Q_C /Q_B Q_A	00	01	11	10
0	1	1	1	1
1	1	1	x	1

Eqn: 1

T_B:

Q_C /Q_B Q_A	00	01	11	10
0	0	1	1	0
1	0	1	x	0

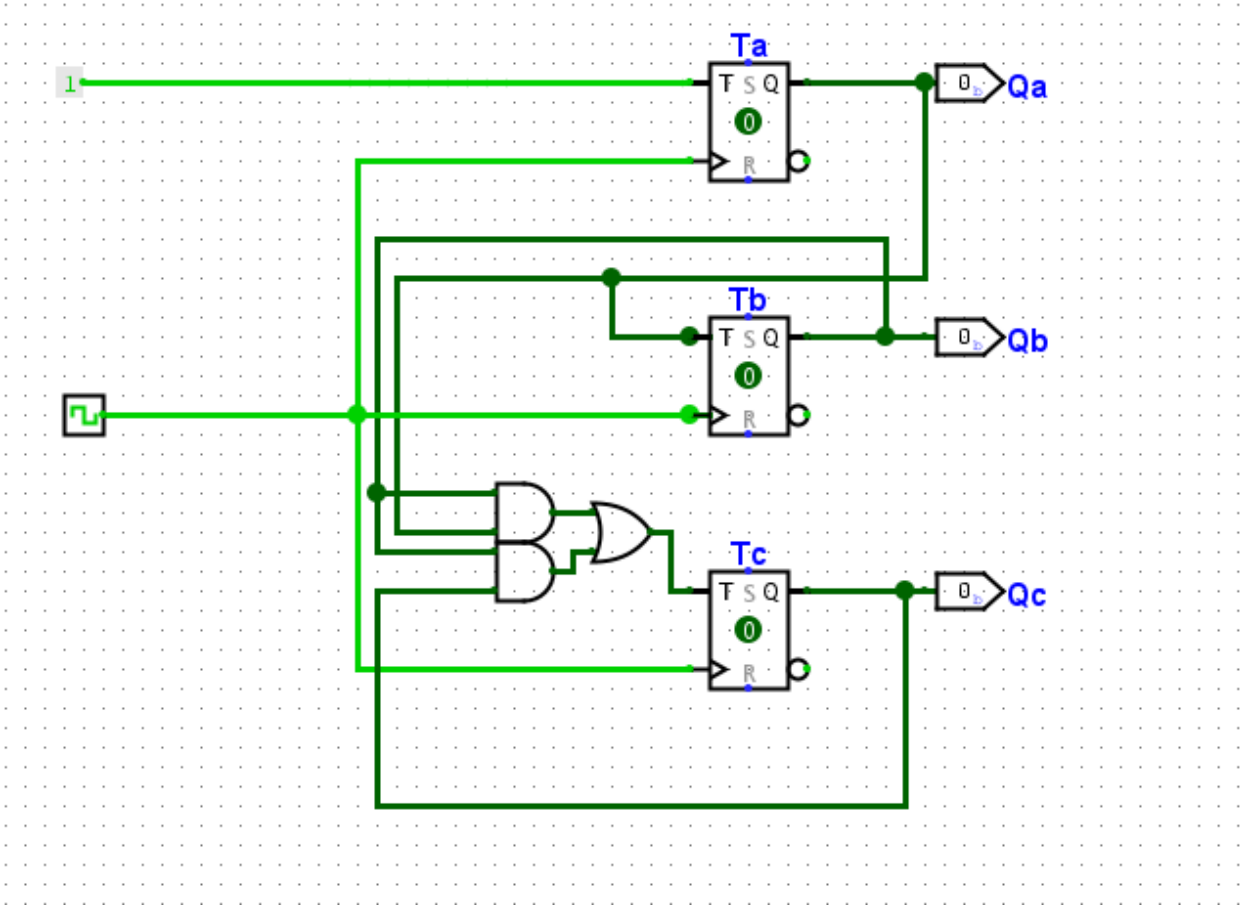
Eqn: Q_A

T_C:

Q_C /Q_B Q_A	00	01	11	10
0	0	0	1	0
1	0	0	x	1

Eqn: $Q_A.Q_B+Q_C.Q_B$

Circuit:



Cost Analysis :

Since T flip flop isn't available in market
We can sort JK to T
2xJK Flip Flop IC 7476 : 36x2=72 BDT
1x2 input OR IC : 7432 : 30x1=30 BDT
1x2 input AND IC : 7408 : 30x1=30 BDT
Total : 132 BDT

Counter Using D Flip Flop

Counts :
0 to 6 (Since,in combinational part 111(7) is set for Don't care)
: 000-001-010-011-100-101-110-Repeat(000)

Current State			Next State			D Flip Flop Outputs		
Q_C	Q_B	Q_A	Q_{CN}	Q_{BN}	Q_{AN}	D_A	D_B	D_C
0	0	0	0	0	1	1	0	0
0	0	1	0	1	0	0	1	0
0	1	0	0	1	1	1	1	0
0	1	1	1	0	0	0	0	1
1	0	0	1	0	1	1	0	1
1	0	1	1	1	0	0	1	1
1	1	0	0	0	0	0	0	0

K-Maps :

D_A:

Q_C /Q_B Q_A	00	01	11	10
0	1	0	0	1
1	1	0	x	0

Eqn: $Q_C' . Q_A' + Q_B' . Q_A'$

D_B:

Q_C /Q_B Q_A	00	01	11	10
0	0	1	0	1
1	0	1	x	0

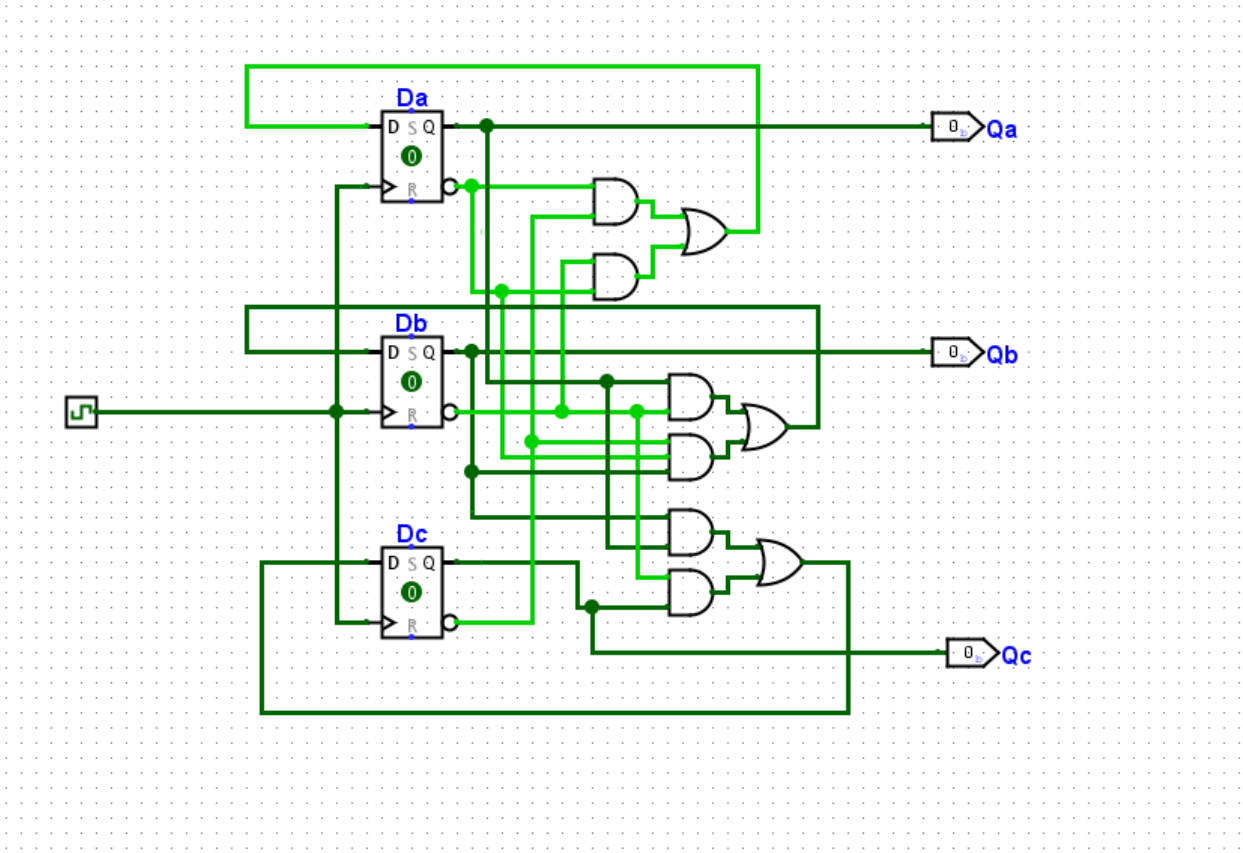
Eqn: $Q_B'.Q_A+Q_C'.Q_B.Q_{A'}$

D_C:

Q_C /Q_B Q_A	00	01	11	10
0	0	0	1	0
1	1	1	x	0

Eqn: $Q_B.Q_A+Q_C.Q_B'$

Circuit :



Cost Analysis :

2xD Flip Flop IC 7474 : 37x2=74 BDT
1x2 input OR IC : 7432 : 30x1=30 BDT
2x2 input AND IC : 7408 : 30x2=60 BDT
Total : 162 BDT

Counter Using JK Flip Flop

Counts :
0 to 6 (Since,in combinational part 111(7) is set for Don't care)
: 000-001-010-011-100-101-110-Repeat(000)

Current State			Next State			JK Flip Flop Outputs					
Q_C	Q_B	Q_A	Q_{CN}	Q_{BN}	Q_{AN}	J_A	K_A	J_B	K_B	J_C	K_C
0	0	0	0	0	1	1	X	0	X	0	X
0	0	1	0	1	0	X	1	1	X	0	X
0	1	0	0	1	1	1	X	X	0	0	X
0	1	1	1	0	0	X	1	X	1	1	X
1	0	0	1	0	1	1	X	0	X	X	0
1	0	1	1	1	0	X	1	1	X	X	0
1	1	0	0	0	0	0	X	X	1	X	1

K-Maps :

J_A:

Q_C /Q_B Q_A	00	01	11	10
0	1	X	X	1
1	1	X	-	0

Eqn: $Q_C' + Q_B'$

K_A:

Q_C /Q_B Q_A	00	01	11	10
0	X	1	1	X
1	X	1	-	X

Eqn: 1

J_B:

Q_C /Q_B Q_A	00	01	11	10
0	0	1	X	X
1	0	1	-	X

Eqn: Q_A

K_B:

Q_C /Q_B Q_A	00	01	11	10
0	X	X	1	0
1	X	X	-	1

Eqn: Q_A+Q_C

J_C:

Q_C /Q_B Q_A	00	01	11	10
0	0	0	1	0
1	X	X	-	X

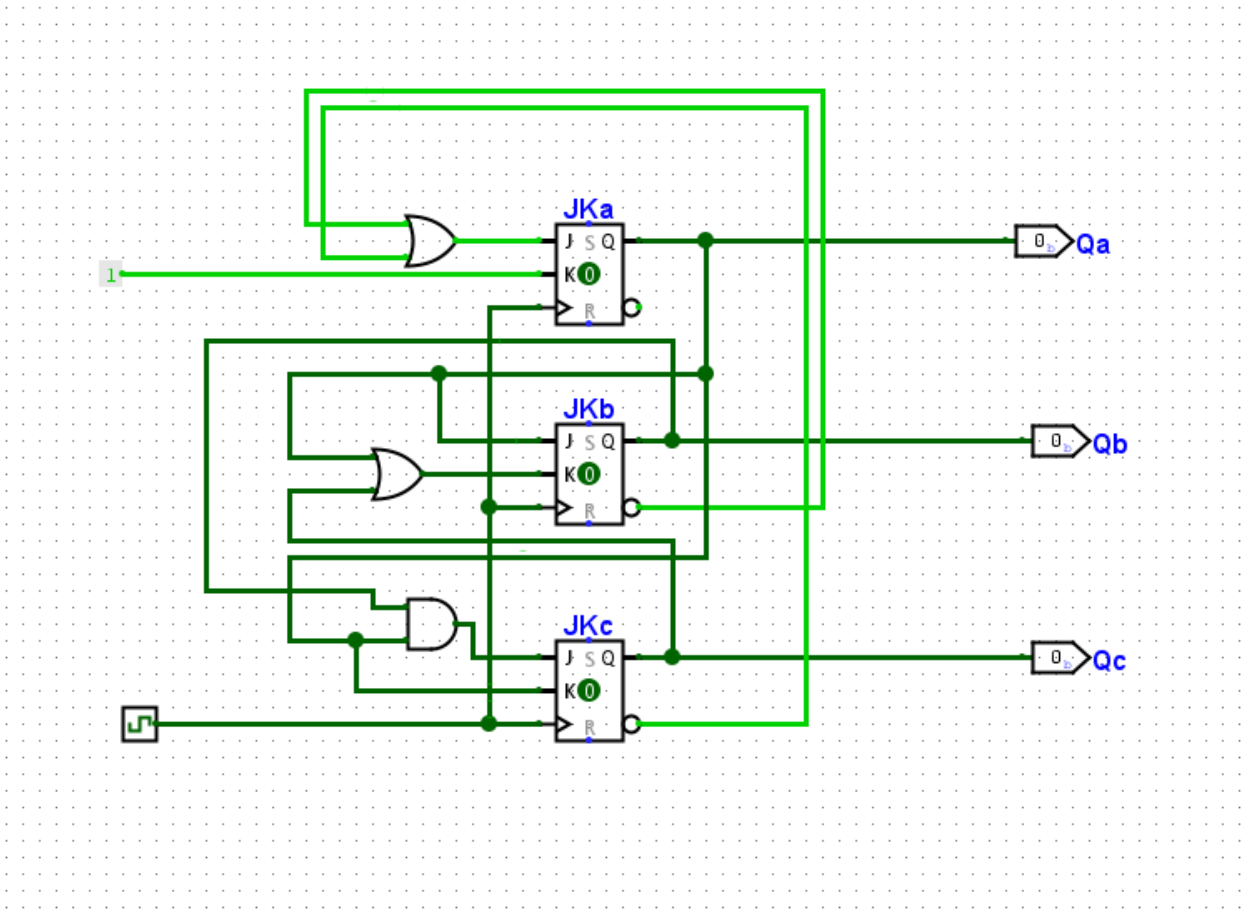
Eqn: Q_B.Q_A

K_C:

Q_C /Q_B Q_A	00	01	11	10
0	X	X	X	X
1	0	0	-	1

Eqn: Q_B

Circuit:



Cost Analysis :

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