

Solution;

DLD/Assignment 2

For cnt (counter) circuit;

For display circuit;

ABC	X=0	X=1
000	001	000
001	010	000
010	011	000
011	100	000
100	101	000
101	110	000
110	111	000
111	000	000

ABC	X=0	X=1
000	000	X
001	001	X
010	010	110
011	011	100
100	100	111
101	101	X
110	110	011
111	111	010

A_{next}

0	0	1	0
1	1	0	1
0	0	0	0
0	0	0	0

x () A

A_{next}

0	0	0	0
1	1	1	1
1	X	0	0
X	X	1	1

x () A

$$A_{next} = x'AB' + x'A'BC + x'ABC'$$

$$A_{next} = x'A + xA' + AB'$$

B_{next}

0	1	0	1
0	1	0	1
0	0	0	0
0	0	0	0

x () A

B_{next}

0	0	1	1
0	0	1	1
1	X	1	1
X	X	0	1

x () A

$$B_{next} = x'B'C + x'BC'$$

$$B_{next} = xA + x'B + BC'$$

C_{next}

1	0	0	1
1	0	0	1
0	0	0	0
0	0	0	0

x () A

C_{next}

0	1	1	0
0	1	1	0
1	X	0	1
X	X	0	0

x () A

$$C_{next} = x'C'$$

$$C_{next} = x'C + xAC'$$

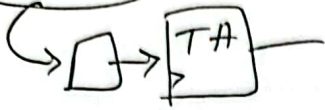
a)

B			
0	0	1	0
0	0	1	0
1	1	1	1
0	0	0	0
A			

X

T-flip-flop

$$T_A = \overline{X}A + X'BC$$



B			
0	1	0	1
1	0	1	0
1	1	1	1
0	0	0	0
A			

X

$$T_B = \overline{X}A + A\overline{B}C' + ABC + X'A\overline{B}C' + X'A\overline{B}C'$$

Tc

B			
1	1	1	1
1	1	1	1
0	1	1	0
0	1	1	0
A			

X

T-flip-flop

$$T_C = C + X'$$

TB

B			
0	1	1	0
0	1	1	0
0	0	1	1
0	0	1	1
A			

X

T-flip-flop

$$T_B = \overline{X}'C + BC + XB$$



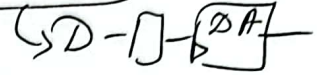
b)

B			
0	0	0	0
1	1	1	1
1	X	0	0
X	X	1	1
A			

X

D-flip-flop

$$D_A = \overline{X}'A + XA' + AB'$$



J_B

B			
0	0	X	X
0	0	X	X
1	X	X	X
X	X	X	X
A			

X

(JK) flip-flop



K_B

B			
X	X	0	0
X	X	0	0
X	X	0	0
X	X	1	0
A			

X

$$K_B = \overline{X}A'C$$

T-flip flop

Tc

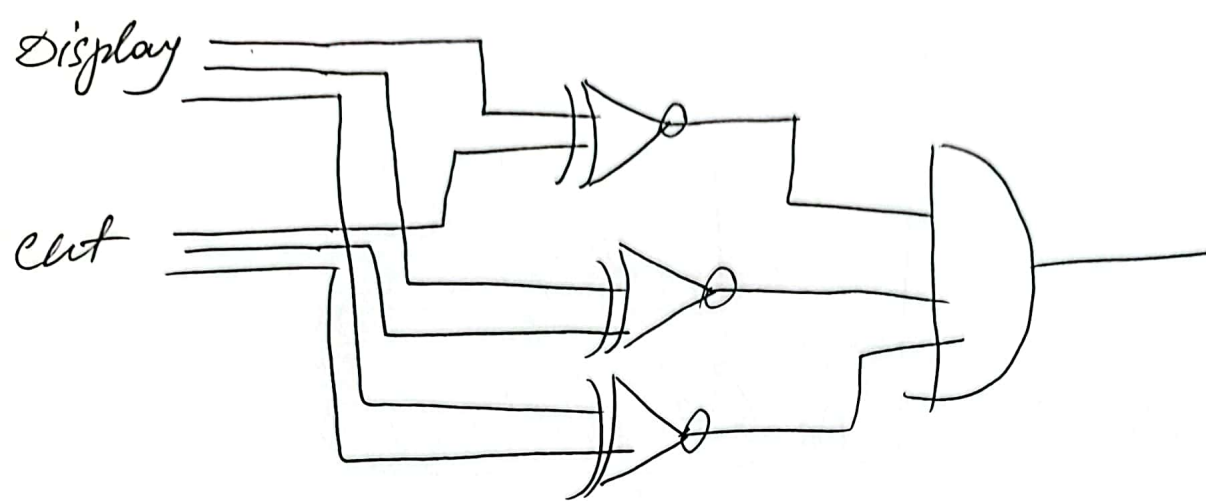
B			
0	0	0	0
0	0	0	0
1	X	1	1
X	X	1	0
A			

X

$$T_C = \overline{X}C + XAC'$$



The combinational circuit should be;



Now we will combine all circuits;
sequential + combinational
in one final .cnc file.
