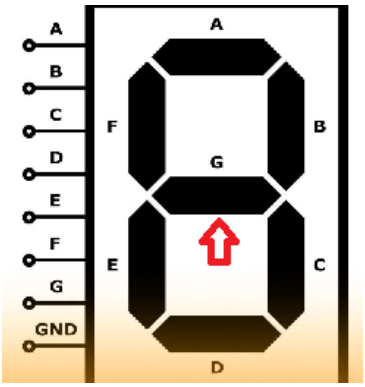
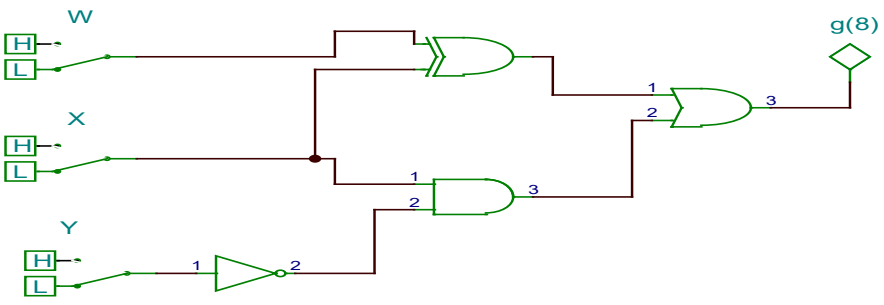
1. Design and implement a 7 segments decoder for the segment g(8).



Count	G(8)
0	0
1	0
2	1
3	1
4	1
5	1
6	1
7	0

W XY	0	1
00	0	1
01	0	1
11	1	0
10	1	1

G(8) = W'X + WX' + XY' = W(+)X + XY'



2. Using T-FF Design and implement a synchronous oop counter that counts: 5→3→ 2→ 4→6.

Count	Q2	Q1	Q0
5	1	0	1
3	0	1	1
2	0	1	0
4	1	0	0
6	1	1	0

Q2 Q1Q0	0	1
00	d	0
01	d	0
11	1	d
10	0	1

T0 = Q1Q2 + Q1Q0 = Q1(Q2+Q0)

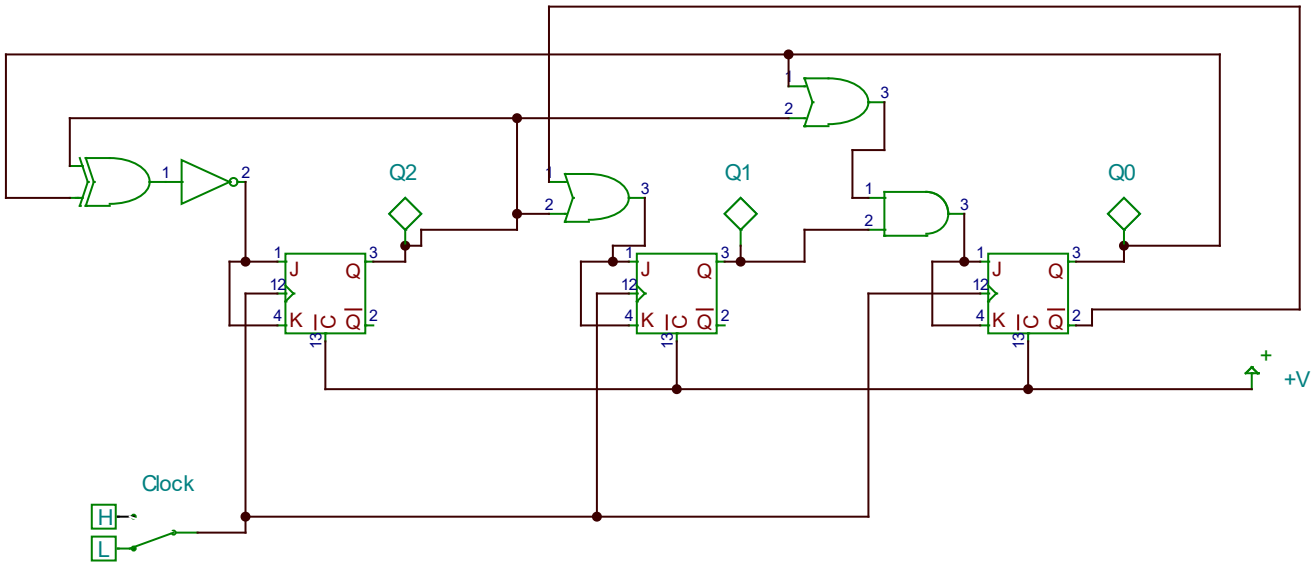
Count	Q2	Q1	Q0
5	1	0	1
3	0	1	1
2	0	1	0
4	1	0	0
6	1	1	0

Q2 Q1Q0	0	1
00	d	1
01	d	1
11	0	d
10	1	1

T1 = Q2 + Q0’

Q2 Q1Q0	0	1
00	d	0
01	d	1
11	0	d
10	1	0

T2 = Q2Q0 + Q2’Q0’ = (Q2(+)Q0)’



3 Simplify Y = A(+)B +(D(+)C)’ + C’D + ABC

= A’B + AB’ +C’D’ + CD + C’D + ABC

AB CD	00	01	11	10
00	1	1	1	1
01	1	1	1	1
11	1	1	1	1
10	0	1	1	1

Y’ = A’B’CD’ → Y” = (A’B’CD’)’ = A+B+C’+D