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# COSN 21 - Pre Lab # 3

## • TRUTH TABLE

CS	LS	RS	RR	CL	LL	RL
0	0	0	0	0	0	1
0	0	0	1	0	0	1
0	0	1	0	0	0	1
0	0	1	1	0	0	1
0	1	0	0	0	1	0
0	1	0	1	0	1	0
0	1	1	0	0	1	0
0	1	1	1	0	0	1
1	0	0	0	1	0	0
1	0	0	1	1	0	0
1	0	1	0	1	0	0
1	0	1	1	1	0	0
1	1	0	0	1	0	0
1	1	0	1	1	0	0
1	1	1	0	1	0	0
1	1	1	1	1	0	0

## • K-map - output CL

RS \ CS	RR	00	01	11	10
00	0	0	0	0	0
01	0	0	0	0	0
11	1	1	1	1	1
10	1	1	1	1	1

$$CL = CS$$

## LL

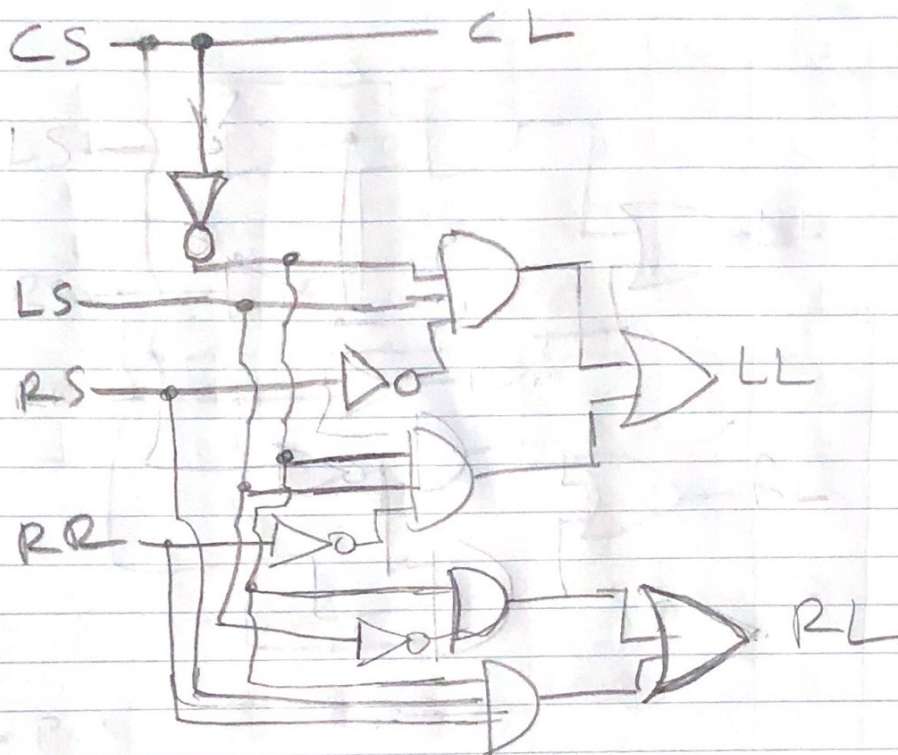
$$LL = \overline{CS}LS\overline{RS} + LS\overline{CS}R\overline{R}$$

RS \ CS	RR	00	01	11	10
00	0	0	0	0	0
01	0	0	0	0	0
11	0	0	0	0	0
10	0	0	0	0	0

$$RL = \overline{CS}LS + \overline{CS}RS\overline{RR}$$

RS \ CS	RR	00	01	11	10
00	1	1	1	1	1
01	0	0	0	0	0
11	0	0	0	0	0
10	0	0	0	0	0

# Logic circuit



CL |  $CL = CS$

LL |  $\overline{LL} = \overline{LS + CS + RS RR}$   
 $= (\overline{LS}) (\overline{CS}) (\overline{RS} + \overline{RR})$

		rr	00	01	11	10
cs	LS	00	0	0	0	0
	01	1	1	0	1	
	11	0	0	0	0	
	10	0	0	0	0	

RL |  $\overline{RL} = \overline{CS + LS RS + LS RR}$   
 $= (\overline{CS}) (\overline{LS} + \overline{RS}) (\overline{LS} + \overline{RR})$

		rr	00	01	11	10
cs	LS	00	1	1	1	1
	01	0	0	1	0	
	11	0	0	0	0	
	10	0	0	0	0	



• Cost of Sop

$$\begin{aligned}\text{cost} &= \# \text{ of gates} + \# \text{ of inputs to gates} \\ &= (10) + (19) = \boxed{29}\end{aligned}$$

• Cost of POS

$$\begin{aligned}\text{cost} &= \# \text{ of gates} + \# \text{ of inputs to gates} \\ &= (4 + 2 + 3) + (4 + 6 + 6) \\ &= 9 + 16 \\ &= \boxed{25}\end{aligned}$$

POS is cheaper as  $25 < 29$ . The cost of POS is 25, and the cost of SOP is 29.