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Exercise 1. $(\sim A + (C + B)) * (\sim(\sim B * \sim C))$

Legend: \sim = Not; $+$ = OR; $*$ = AND

A	B	C	A'	B'	C'	C + B	A' + (C + B)	(B' * C')	(B' * C')'	(A' + (C + B)) * (B' * C')'
0	0	0	1	1	1	0	1	1	0	0
0	0	1	1	1	0	1	1	0	1	1
0	1	0	1	0	1	1	1	0	1	1
0	1	1	1	0	0	1	1	0	1	1
1	0	0	0	1	1	0	0	1	0	0
1	0	1	0	1	0	1	1	0	1	1
1	1	0	0	0	1	1	1	0	1	1
1	1	1	0	0	0	1	1	0	1	1
Inputs										Output

	Product	Sum	Product of Sum
0	—	ABC	$(A+B+C)(A'+B'+C')$
1	$A'B'C$	—	
1	$A'B'C'$	—	Sum of Product
1	$A'BC$	—	$(A'B'C) + (A'B'C') +$
0	—	$A'BC$	$(A'BC) + (AB'C) +$
1	$AB'C$	—	$(ABC') + (ABC)$
1	ABC'	—	
1	ABC	—	

Exercise 2. $\sim(\sim A * B) * \sim(\sim A * \sim B) + A * C$

Legend: \sim = Not; $+$ = OR; $*$ = AND

A	B	C	A'	B'	C'	$(\sim A * B)$	$\sim(\sim A * B)$	$(\sim A * \sim B)$	$\sim(\sim A * \sim B)$	$(A * C)$...
0	0	0	1	1	1	0	1	1	0	0	
0	0	1	1	1	0	0	1	1	0	0	
0	1	0	1	0	0	1	0	0	1	0	
0	1	1	1	0	1	1	0	0	1	0	
1	0	0	0	1	1	0	1	0	1	0	
1	0	1	0	1	0	0	1	0	1	0	
1	1	0	0	0	1	0	1	0	1	1	
1	1	1	0	0	0	0	1	0	1	1	

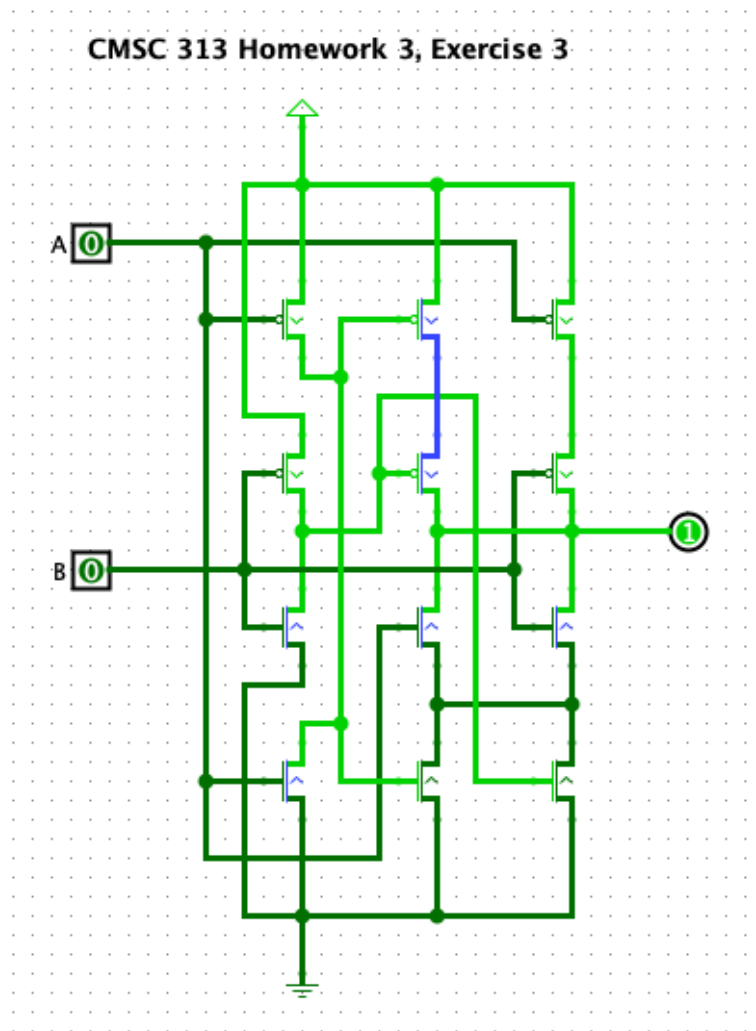
Inputs

...	$\sim(\sim A * B) * \sim(\sim A * \sim B)$	$\sim(\sim A * B) * \sim(\sim A * \sim B) + (A * C)$	
	0	0	output
	0	0	
	0	0	
	0	0	
	1	1	
	1	1	
	1	1	
	1	1	

	Product	Sum	Sum of Product
0	—	A B C	$(ABC) + (ABC') + (AB'C) +$
0	—	A B C'	$(AB'C')$
0	—	A B' C	
0	—	A B' C'	
1	$AB'C'$	—	Product of Sum
1	$A B' C$	—	$(A+B'+C')(A+B'+C)$
1	$A B C'$	—	$(A+B+C')(A+B+C)$
1	$A B C$	—	

Exercise 3. (20 points)

For the CMOS circuit shown below,



A) (5 points) Provide a truth table for the circuit's function. You may use the Logisim circuit, hw3.circ (Available on blackboard, download-able as a separate **Logisim** circuit file within Homework 3 folder.), to determine the truth table.

B) (5 points) Write down the Sum-of-Products (SOP) Boolean formula for the truth table.

C) (5 points) Write down the Product-of-Sums (POS) Boolean formula for the truth table.

D) (5 points) Draw the logic diagram of the POS formula using AND, OR and NOT gates (do not simplify) on **Logisim** and submit the Logisim circuit file separately.

