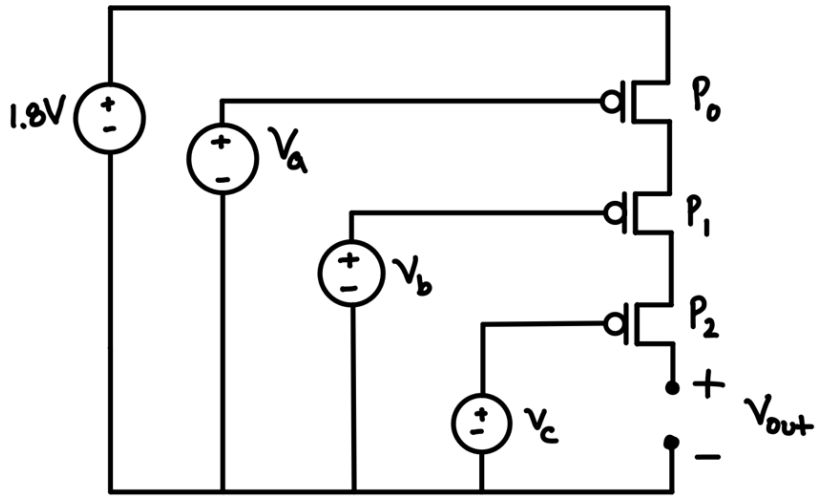
Transistor-Level to Switch-Level Schematics

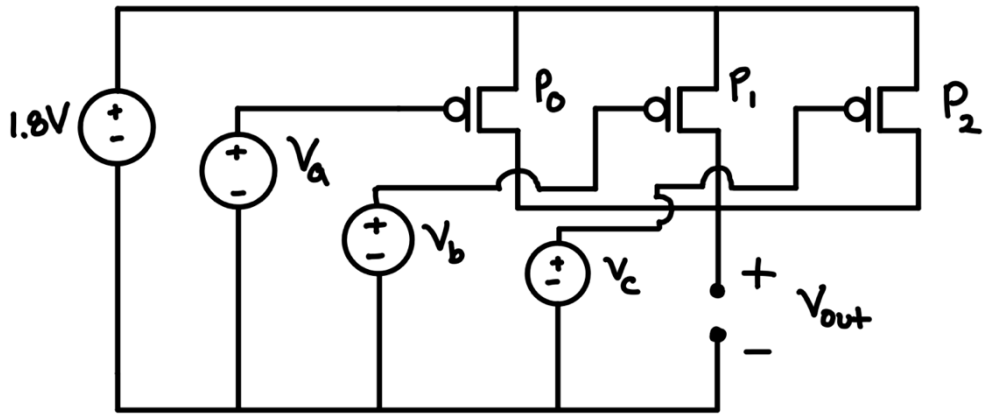
For each of the following problems, convert the transistor level schematic to a switch-level schematic. Also fill out the provided simulation table. Use C to indicate the corresponding MOSFET is closed and O to indicate the corresponding MOSFET is open.

a.



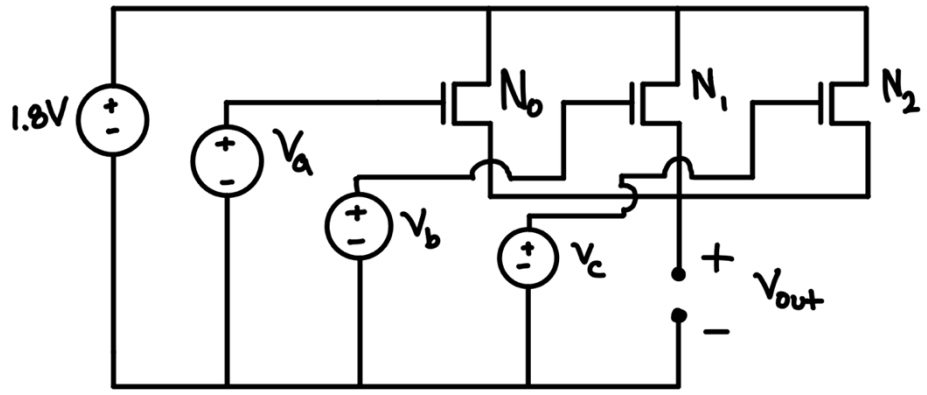
V_a	V_b	V_c	P_0	P_1	P_2	V_{out}
0 V	0 V	0 V				
0 V	0 V	1.8 V				
0 V	1.8 V	0 V				
0 V	1.8 V	1.8 V				
1.8 V	0 V	0 V				
1.8 V	0 V	1.8 V				
1.8 V	1.8 V	0 V				
1.8 V	1.8 V	1.8 V				

b.



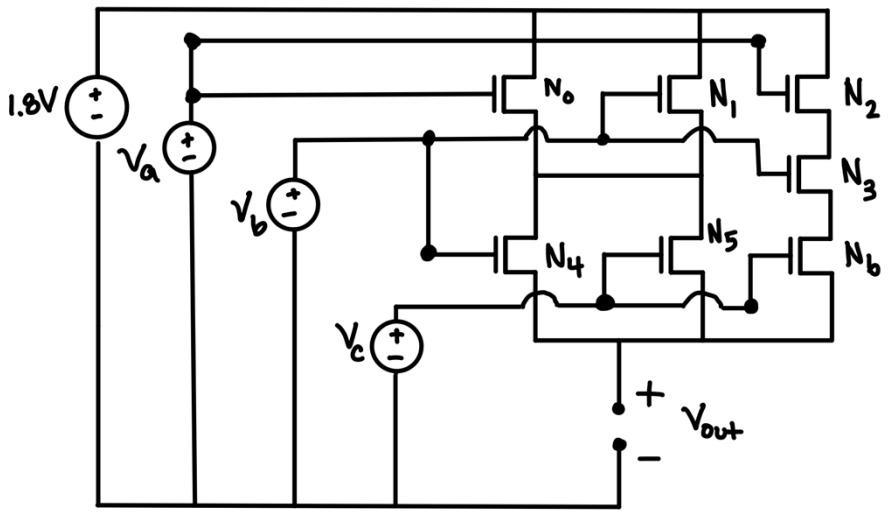
V_a	V_b	V_c	P_0	P_1	P_2	V_{out}
0 V	0 V	0 V				
0 V	0 V	1.8 V				
0 V	1.8 V	0 V				
0 V	1.8 V	1.8 V				
1.8 V	0 V	0 V				
1.8 V	0 V	1.8 V				
1.8 V	1.8 V	0 V				
1.8 V	1.8 V	1.8 V				

c.



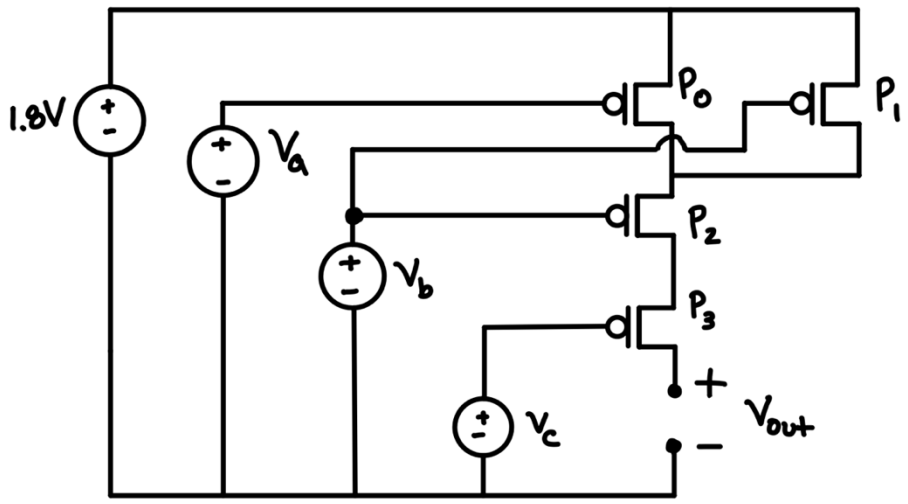
V_a	V_b	V_c	N_0	N_1	N_2	V_{out}
0 V	0 V	0 V				
0 V	0 V	1.8 V				
0 V	1.8 V	0 V				
0 V	1.8 V	1.8 V				
1.8 V	0 V	0 V				
1.8 V	0 V	1.8 V				
1.8 V	1.8 V	0 V				
1.8 V	1.8 V	1.8 V				

d.



V_a	V_b	V_c	N_0	N_1	N_2	V_{out}
0 V	0 V	0 V				
0 V	0 V	1.8 V				
0 V	1.8 V	0 V				
0 V	1.8 V	1.8 V				
1.8 V	0 V	0 V				
1.8 V	0 V	1.8 V				
1.8 V	1.8 V	0 V				
1.8 V	1.8 V	1.8 V				

e.

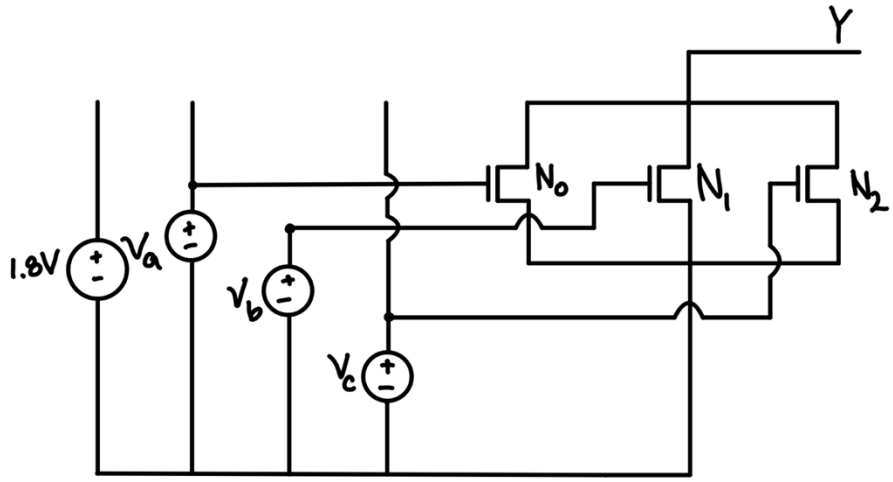


V_a	V_b	V_c	P_0	P_1	P_2	V_{out}
0 V	0 V	0 V				
0 V	0 V	1.8 V				
0 V	1.8 V	0 V				
0 V	1.8 V	1.8 V				
1.8 V	0 V	0 V				
1.8 V	0 V	1.8 V				
1.8 V	1.8 V	0 V				
1.8 V	1.8 V	1.8 V				

Complete the Complementary Circuit

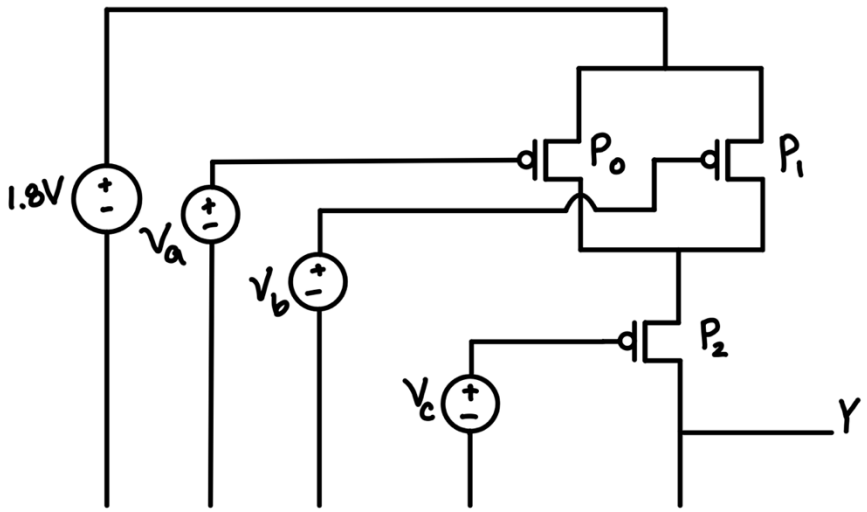
For each NMOS or PMOS circuit, complete its complementary circuit and fill out the simulation table. Label added NMOS or PMOS circuits.

a.



V_a	V_b	V_c	N_0	N_1	N_2	P_0	P_1	P_2	V_{out}
0 V	0 V	0 V							
0 V	0 V	1.8 V							
0 V	1.8 V	0 V							
0 V	1.8 V	1.8 V							
1.8 V	0 V	0 V							
1.8 V	0 V	1.8 V							
1.8 V	1.8 V	0 V							
1.8 V	1.8 V	1.8 V							

b.



V_a	V_b	V_c	N_0	N_1	N_2	P_0	P_1	P_2	V_{out}
0 V	0 V	0 V							
0 V	0 V	1.8 V							
0 V	1.8 V	0 V							
0 V	1.8 V	1.8 V							
1.8 V	0 V	0 V							
1.8 V	0 V	1.8 V							
1.8 V	1.8 V	0 V							
1.8 V	1.8 V	1.8 V							