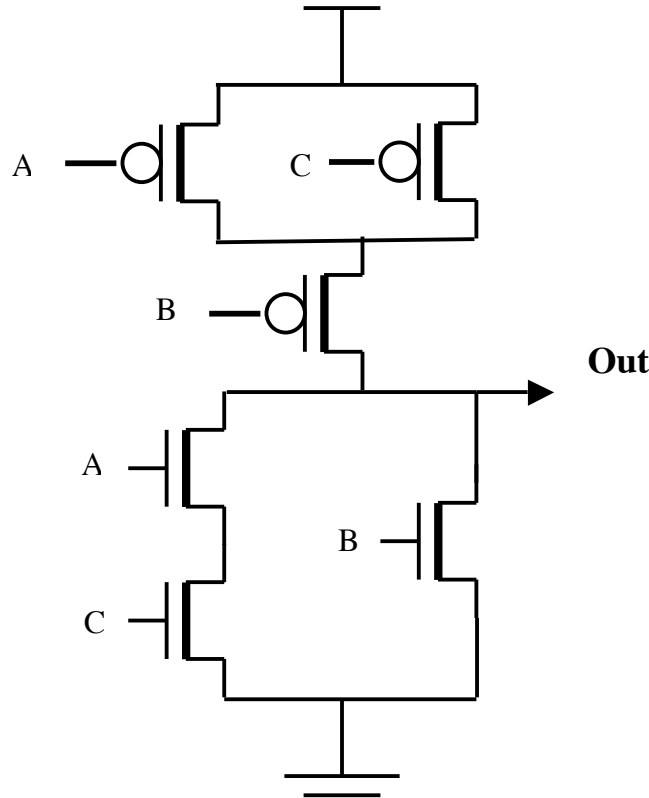


Transistor-Level Circuit Understanding

#1. For the following switch level circuit, complete the truth table computed. If a floating or shorted output is detected, indicate that in the truth table. If no floats or shorts are detected, write the Boolean expression computed by the circuit. It may help to derive the Boolean expression first



Write the Boolean expression for this function pmos -> $B' (A' + C')$ nmos -> $(AC + B)'$

From pmos:
"0" when B = 1
"0" when A,C=1,1
"1" elsewhere

From nmos:
"1" when
 $(AC+B) = 0$
same as above.

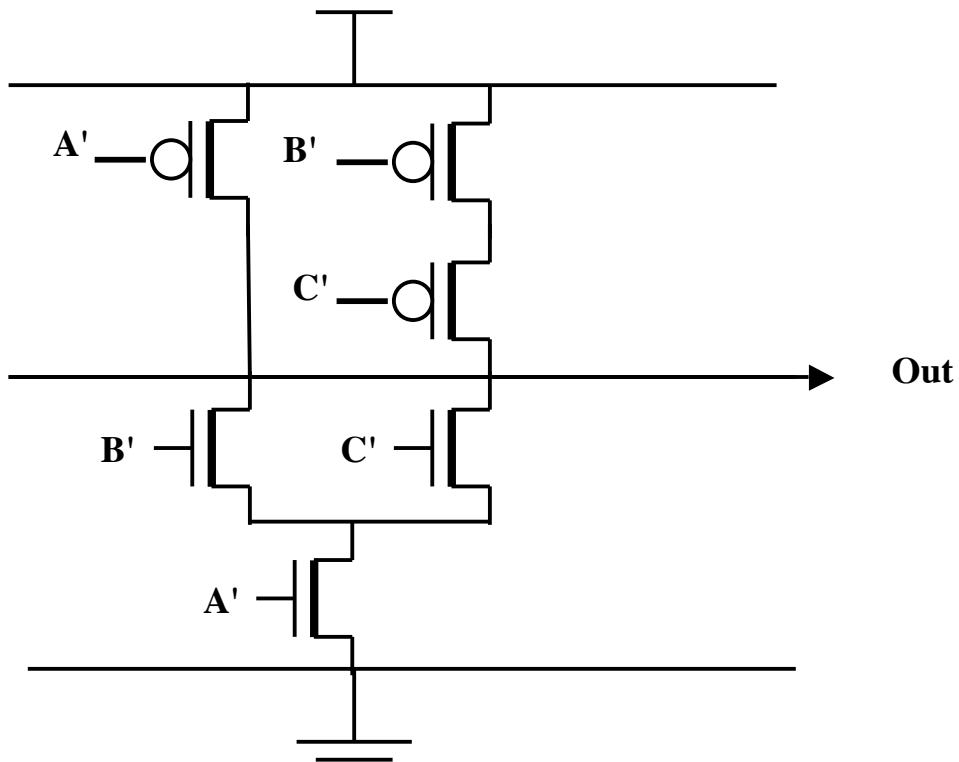
A	B	C	Out
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0

#2. Simplify the Boolean expression: $Out = A + C(B + C')$ = **A + CB**

Complete the truth table.

A	B	C	Out
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

Draw the CMOS transistor diagram. Assume A, A', B, B', C, C' signals are available. Use 6 transistors.



Be sure to work other example problems so that you can quickly take a transistor circuit and write the Boolean logic expression, or design the transistor circuit for a given Boolean expression.