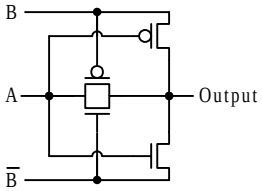
CS/EE 120A
Homework #3 Given 3/6/01. Due 3/13/01

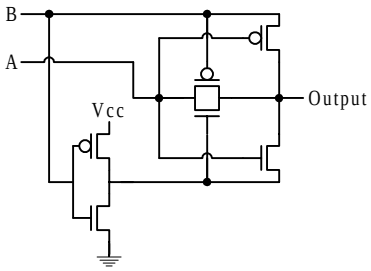
1. Use only 4 CMOS transistors to draw the circuit for the XOR gate. (4)

Not graded ☹

Answer

XOR

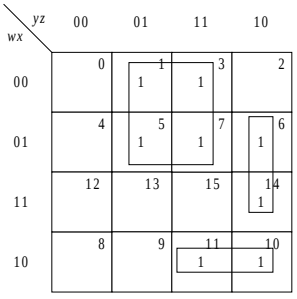




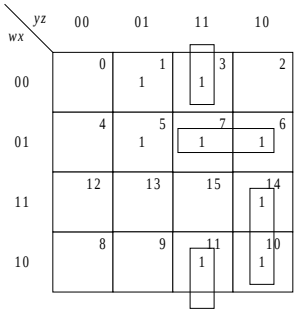
(*I was wrong in telling some students that if they use both the non-inverted and inverted signals, they have to add two more inverters. So if you use only inputs A and B, then your circuit will have 6 transistors like the circuit on the right. Otherwise, it is like the circuit on the left.)*

2. Write the function that eliminates the static hazard(s) in the function $F = w'z + xyz' + wx'y$ (4)

Answer



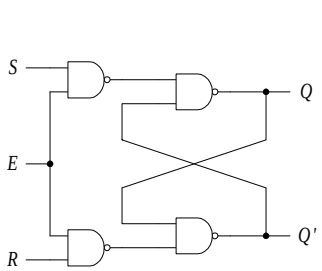
Original function

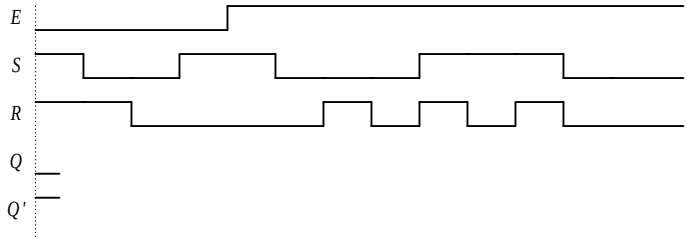


After adding the overlaps

$F = w'z + xyz' + wx'y + w'xy + wyz' + x'yz$

3. Given the following circuit and trace for the inputs of the circuit, draw the trace for the outputs Q and Q'. (4)





Answer