10/16/03

EE 42 – Introduction to Electronics for Computer Science

Fall 2003, **Prof. A. R. Neureuther**
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Course Web Site **http://www - inst.eecs.berkeley.edu/~ee42/**

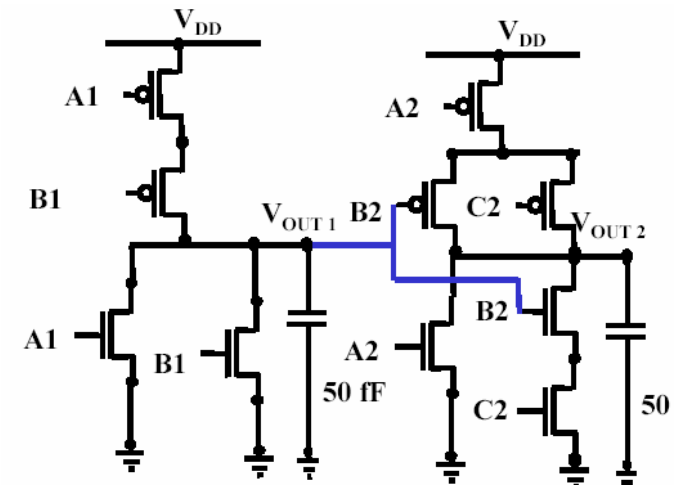
Problem Set # 10

Due: 1 PM Nov 20th, 2003 in box outside 240 Cory

Announcement:
Reading Week #10: Review Schwarz and Oldham 11.2, 11.3, Class Handouts
Topics: Logic functions, Average Resistances.

10.1 Logic Functions Use the circuit to the right.

a) Write the logic function for Vout1
b) Write the logic function for Vout2
c) What is the propagation delays of this circuit in terms of inverter delays?

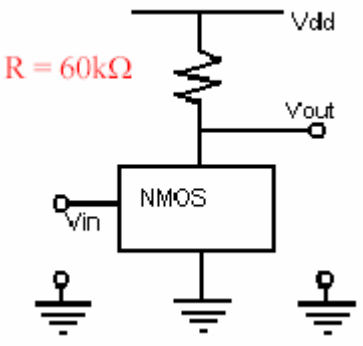


10.2 Average Resistances Use the circuit to the right.

a) Evaluate the equivalent resistance of the pull down network for Vdd=5V, Vth=1V, Vin= 2V and Vout_sat=1V

b) Evaluate the equivalent resistance for Vdd=3V, Vth=0.43V, Vin=2V and Vout_sat=0.63V

NMOS: K'n = 100 μA/V^2 and W/L = 2



$$I_{OUT-SAT-n} = k_n'\left(\frac{W}{L}\right)_n (V_{IN} - V_{Tn})V_{OUT-SAT-n}$$

$$I_{OUT-SAT-p} = k_p'\left(\frac{W}{L}\right)_p (V_{DD} - V_{IN} - |V_{Tp}|)V_{OUT-SAT-p}$$