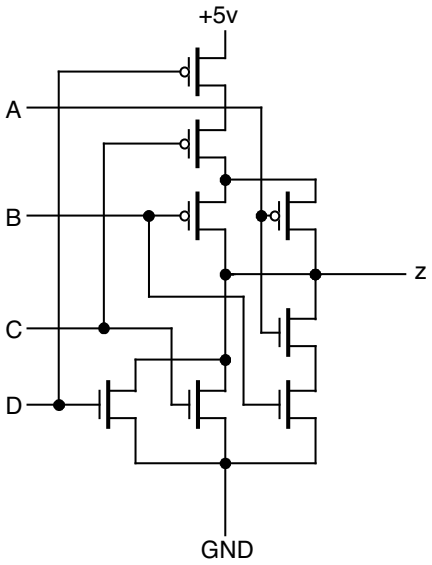
Due: November 11, 2004

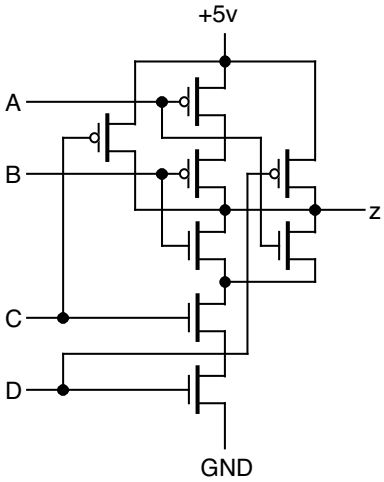
1. (30 points) Draw schematics for the following functions using AND, OR and NOT gates. (Do not simplify the formulas.)
   (a) $\overline{X}Y + XY\overline{Z} + XYZ$
   (b) $(X\overline{Y} + \overline{W}Z)(W\overline{X} + Y\overline{Z})$
   (c) $\overline{(X+Y)}\,\overline{(\overline{X}+\overline{Y})}$

2. (30 points) Using the postulates and theorems of Boolean algebra in Table A-1 (p. 451), simplify the following formulas. *Show all of your work.*
   (a) $WXYZ(WXY\overline{Z} + W\overline{X}YZ + \overline{W}XYZ + WX\overline{Y}Z)$
   (b) $AB + AB\overline{C}D + ABD\overline{E} + AB\overline{C}E + \overline{C}DE$
   (c) $MNO + \overline{QPN} + PRM + \overline{Q}OM\overline{P} + MR$

3. (40 points) For each CMOS circuit below,
   (a) Provide a truth table for the circuit's function.
   (b) For diagram (a), write down the Sum-of-Products (SOP) Boolean formula for the truth table. For diagram (b), wrtie down the Product-of-Sums (POS) Boolean formula.
   (c) Simplify the SOP or POS formula using the postulates and theorems of Boolean Algebra (p. 451). *Show all work.*
   (d) Draw the logic diagram of the simplified formula using AND, OR, NAND, NOR and NOT gates.



(a)



(b)