Brown University
Division of Engineering
EN1600 Design and Implementation of VLSI Systems. Spring 2008.
Prof. Sherief Reda
Assignment #1. 15 points.
Due Wednesday Feb 16 2008.

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1. [6 points] Sketch a transistor-level schematic for a single-stage CMOS logic gate for each of the following functions

$$Y = \overline{ABC + D} \qquad Y = \overline{(AB + C)D} \qquad Y = \overline{AB + C(A + B)}$$

2. [4 points] Construct the truth table of a 3-input XOR gate. Then sketch a transistor-level schematic of a CMOS version of the gate. You may assume you have both true and complementary versions of the inputs available. Attempt to use the minimum number of transistors to achieve the required functionality.

3. [5 points] Independent readings.
   a. Write brief 1-2 paragraphs on the two inventors of the IC (pointing out the companies they worked for, the motivations for their invention, ..., etc)
   b. From the top 20 semiconductor companies (according to sales in 2007), identify all corporations of USA origin, and for each company identify the main semiconductor products that they offer. If possible report for each company its number of US employees and its rank in the list of best tech companies to work for.