

Brown University
Division of Engineering
EN1600 Design and Implementation of VLSI Systems. Spring 2008.
Prof. Sherief Reda
Assignment #2. 15 points.
Due Wednesday Feb 13 2008.



1. [5 points] A 3-input majority gate returns a true output if at least two of the inputs are true. A minority gate is its complement. Design a 3-input CMOS minority gate using a single stage of logic.
 - a. sketch a transistor-level schematic
 - b. sketch a stick diagram
 - c. estimate the area from the stick diagram
2. [6 points] Using Tanner L-Edit, design a 3-input NOR gate. Include in your answer: (i) the layout of the gate; (2) report the dimensions and area of the gate; and (iii) report the outcome of applying DRC.
3. [4 points] **Independent Readings.**
 - a. In 2007 Intel announced that it has successfully produced the first prototype processors in 45nm technology. Intel claims that 45nm represents the biggest change in how transistors are fabricated in the last 40 years. In your own words, explain briefly the motivation for “high-k and metal gate” transistors and contrast their fabrication method with the traditional fabrication method we covered in class.