

University of California at Berkeley
College of Engineering
Department of Electrical Engineering and Computer Science

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Quiz 1: January 29
Solution

A *minority function* produces a TRUE output if and only if fewer than half of its inputs are TRUE. Otherwise it produces a FALSE output.

1. In the space below fill in the truth table for a minority function y , with inputs a , b , and c .

abc	y
000	1
001	1
010	1
011	0
100	1
101	0
110	0
111	0

2. Neatly draw a gate-level circuit diagram that implements the truth-table using only AND-gates, OR-gates (any number of inputs) and inverters. Label the inputs and output.

There are several solutions that are correct and a variety of ways of deriving these solutions. However, the most efficient way to get to a correct solution is to realize that the minority function is the complement of the majority function; i.e. when the majority function has value 0, the minority function has value 1 (and vis versa). Therefore the gate-level circuit diagram for the minority function is the same as the majority function with the addition of an inverter on the final output.

