

Quiz 1

1. Consider the following Boolean identity

$$x'y'z + w'xz + wxyz' + wxz + w'xyz = y'z + xz + wxy$$

Prove this identity using the axioms and/or theorems of the general Boolean algebra with only algebraic manipulation.

2. Given the following Boolean expression

$$f = z(x'y + w'x') + (w + y')(xw + z)$$

Show a block diagram representation using only

- (a) NAND gates
- (b) NOR gates

Assume that all inputs are available both uncomplemented and complemented. Do not manipulate the functions to simplify the algebra.

3. Consider a Boolean function defined in sum of minterms form with don't cares as follows:

$$f(a, b, c, d) = \Sigma m(0, 2, 4, 5, 6, 7, 8, 9, 10, 14) + \Sigma d(3, 13)$$

Using Quine-McCluskey tabulation method, derive a minimum sum of products expression for $f(a, b, c, d)$.