Tuesday Reading Assessment: Chapters 3, 4-1 and 4-2

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1 Boolean Algebra

1. Let the conjugate of a boolean input A be $\bar{A}$. The circuit equivalent of the conjugate is the action of the inverter, changing 0 to 1 and 1 to 0. Further, recall that Boolean multiplication is equivalent to an AND gate, and addition is equivalent to an OR gate. Write the truth table for the following boolean expression:

$$\bar{X}YZ + X\bar{Y}Z + XY\bar{Z} \tag{1}$$

2 Programmable Logic: The AND Array

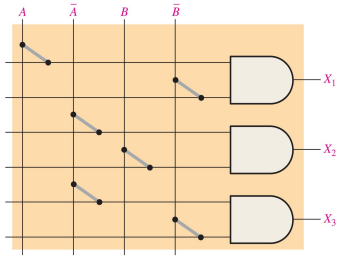

Figure 1: An example of the AND array within the broader category of PLAs.

1. (a) What are the logical expressions for the AND array outputs in the PLA shown in Fig. 1? (b) Draw new connections such that: $X_1 = \bar{A}B$, $X_2 = AB$, and $X_3 = A\bar{B}$.

3 Troubleshooting: Open and Closed Gates

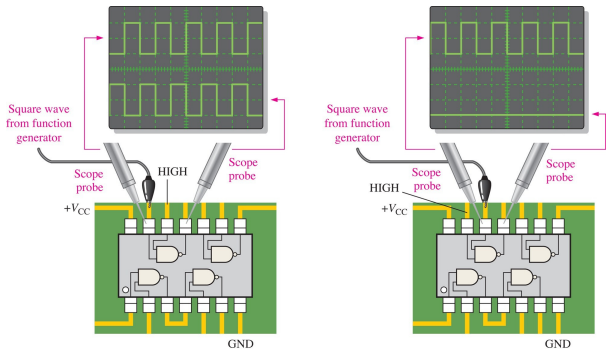

Figure 2: An example of probing a suspect gate with pulsed signal on one input, and HIGH on the other.

1. Which input on the NAND gate pictured in the experiment in Fig. 2 is faulty? What is its level (0 or 1)?