Function Implementation and Minimization

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Introduction

The objective of this lab was to implement simple functions using NAND gates, and to build and test logic functions created from K maps. NAND gate implementation was discussed in the pre-lab, while the K map logic functions were implemented during the lab.

Experiment

A customized function was given to base a K-map off. The K-map below represents the function F=(5,6,7,9,10,13,14).

Diagram

Description automatically generated

Therefore, the function should be x̅0x1x3 + x0x̅2x3 + x1x2x̅3 + x0x2x̅3. The truth table for the equation is below:

Table

Description automatically generated

By inserting the function into the VHDL code from lab 1, a waveform was generated. The output matched the expected results calculated from the truth table.

Diagram

Description automatically generated

Text

Description automatically generated with medium confidence  
Diagram, engineering drawing

Description automatically generated

Conclusion

Initially, the final output was didn’t match the truth table, however that was the result of mixing up the input values. Once the correct input values matched the input variable the output became the expected values.