

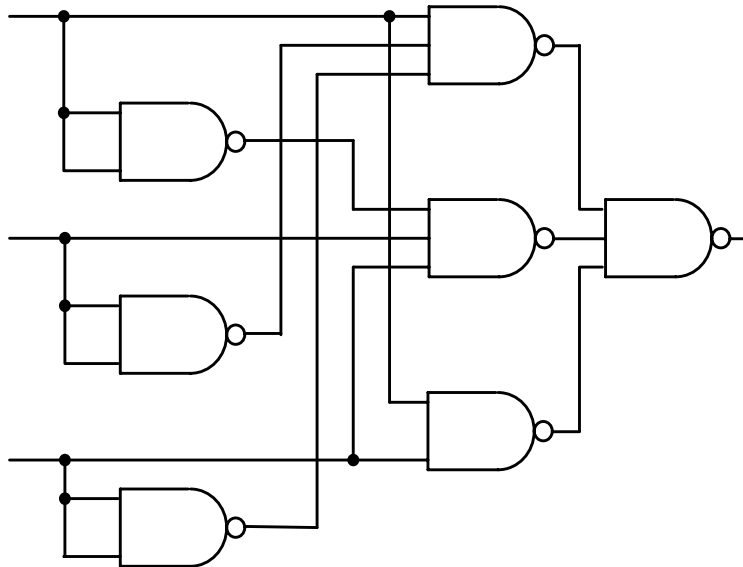
Laboratory 4
CSE 3381
Boolean Function Simplification

This experiment will allow students to gain familiarity with simplification of combinational logic circuits.

PART 1 PRE-LAB: For the circuit given in the diagram below, do the following:

- a) Obtain the Boolean function
- b) Derive the truth table

PART 1 PRE-LAB: LAB INSTRUCTOR'S INITIALS: _____



PART 1 DEMONSTRATION: Construct this circuit using a 7400 2-input NAND gate and a 7410 3-input NAND gate IC. Demonstrate that the circuit is functioning correctly to the lab instructor.

LAB INSTRUCTOR'S INITIALS: _____

PART 2 PRE-LAB: Using the Map Method, simplify this circuit into a minimum sum-of-products (SOP) form. Draw the corresponding SOP circuit diagram.

- c) Show the Map and simplified SOP function
- d) Draw the circuit diagram of the simplified SOP circuit

PART 2 PRE-LAB: LAB INSTRUCTOR'S INITIALS: _____

PART 2 DEMONSTRATION: Construct the simplified SOP form of the circuit using AND, OR and Inverter gates only and show the lab instructor that it functions correctly.

LAB INSTRUCTOR'S INITIALS: _____

PART 3 PRE-LAB: Using the Map Method, simplify this circuit into a minimum product-of-sums(POS) form. Draw the corresponding POS circuit diagram.

- e) Show the Map and simplified POS function
- f) Draw the circuit diagram of the simplified POS circuit

PART 3 PRE-LAB: LAB INSTRUCTOR'S INITIALS: _____

PART 3 DEMONSTRATION: Construct the simplified POS form of the circuit using AND, OR and Inverter gates only and show the lab instructor that it functions correctly.

LAB INSTRUCTOR'S INITIALS: _____

POST-LAB WRITEUP: In addition to turning your (neatly written) truth tables and data from your experiment, circuit diagrams, maps, and your lab sheet with the instructor's initials, also include the following:

- a) Using the equation from part a) of the pre-lab, use Boolean algebra to simplify it to the minimum SOP form that you derived from the Map in part c) of the pre-lab.
- b) Using the equation from part a) of the pre-lab, use Boolean algebra to simplify it to the minimum POS form that you derived from the Map in part e) of the pre-lab.