

**Course Name**: DIGITL LOGIC DES LAB

**Course Number and Section**: **14:332:233:01**

**Experiment**: Lab1 Report

**Lab Instructor**: ZAHRA AREF

**Date Performed**: 9/20/2024

**Date Submitted**: 9/27/2024

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**Course Name**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Course Number and Section**: **14:332:xxx:xx**

**! Important: Please include this page in your report if the submission is a paper submission. For electronic submission (email or Sakai) please omit this page.**

--------------------------For Lab Instructor Use ONLY--------------------------

GRADE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

COMMENTS:

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ECE Lab Report Structure

1. Purpose / Introduction / Overview – describe the problem and provide background information:

In lab 1, the goal was to implement 2 logic functions, F(A, B, C) and G(A, B, C) on breadboards.

1. Approach / Method – the approach took, how problems were solved:

To implement the 2 functions, we used 3 pull up resistors from a 5V rail to be the A B and C inputs. For the logic gates, the 74LS04 (hex inverter/NOT) 74LS08 quad 2-input (AND) 74LS32 quad 2-input (OR) ICs were used. The outputs were then used to turn an LED on or off if the result was 1 or 0 respectively.

1. Results – present your data and analysis, experimental results, etc.

**Circuit Diagram:**

A classroom with a chalkboard

Description automatically generated

**The output of F is labeled on the bottom right. The output of G can be gotten by removing the gates with an X.**

**Truth Tables:**

**F(A, B, C) = A. B + A′. C + B. C (7 Logic Gates used):**

A table with black lines and letters

Description automatically generated with medium confidenceA circuit board with wires and a red light

Description automatically generated

**G(A, B, C) = A. B + A′C (5 Logic Gates used):**

A table with numbers and symbols

Description automatically generated with medium confidenceA circuit board with wires on it

Description automatically generated

**According to the truth tables, functions F and G have the same output.**

4. Conclusion / Summary – what was done and how it was done

Since F and G have the same output, function F can be simplified using Boolean theorems. By the redundancy theorem, term B.C can be removed and still have the same results as G. This also means that 2 gates can be removed from the circuit diagram of F to get the same output, reducing the total number of gates from 7 to 5. The LED can only turn on if the anode(+) goes HIGH and the cathode(-) goes LOW, so the final NOT gate is optional because it serves to invert the signal for the LED to turn on when the function’s results are HIGH.

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