University of Maryland Baltimore County
Department of Computer Science and Electrical Engineering

CMPE 212L, Principles of Digital Design Laboratory

Experiment #5 Friday 2/26/2016

Objective

The main objective in this lab is to practice the implementation of a switching function and compare the complexity and timing to an optimized version.

Required Equipment

- 7400: includes four 2-input NAND gates.
- 7403: includes four 2-input NAND gates.
- 7402: includes four 2-input NOR gates.
- 7408: includes four 2-input AND gates.
- 7404: Hex inverter gates.
- 7486: Quad 2- input exclusive OR.
- 74136: Quad 2- input exclusive OR.
- (10K ohms, 330 ohms) resistors, breadboard, power supply, multi-meter, LED.

Experiments:

1. Implement the function $\overline{f}(a,b,c) = (b \oplus \overline{c}) + \overline{ab}\,\overline{\overline{a} + c}$.
2. Draw the function's truth table and test your implementation's functionality.
3. Simplify the function and implement the simplified version as well.
4. Measure and compare input-output delay time in both implementations.
5. Bonus: compare the power consumption and number of transsisters needed for both implementation.

Figure 2 - 7486

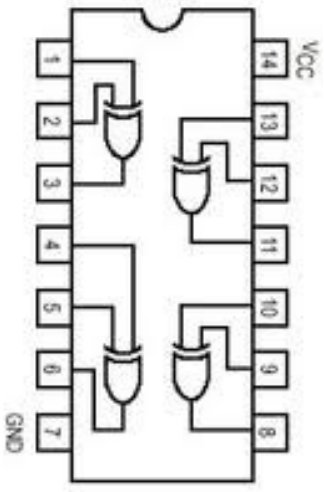

Figure 1 - 7408

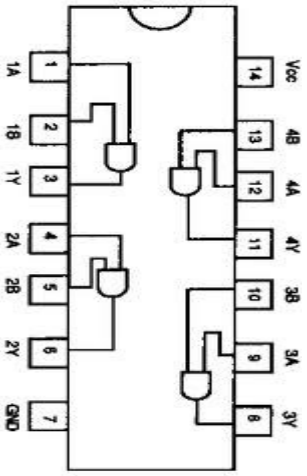

Figure 3 - 7404

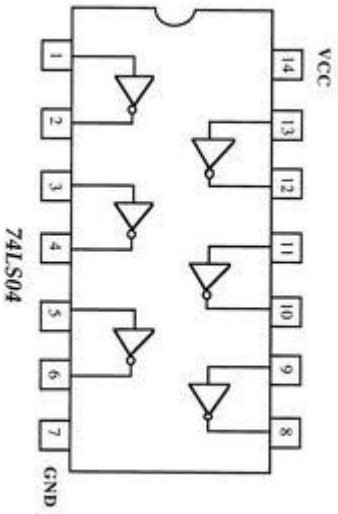

Figure 4 - 7402

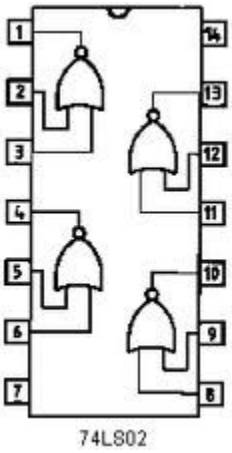

Figure 6 - 7403

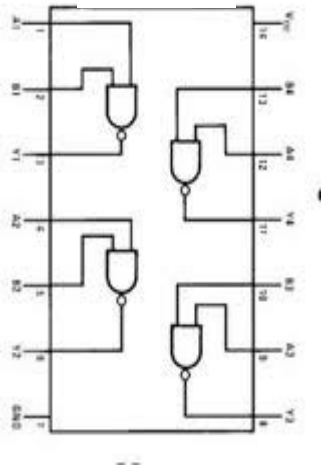

Figure 5 - 7400