Laboratory 1: Introduction to Logic Gates

Part I: Gate basics

- 1. Using a 74LS00 quad NAND gate, verify the NAND gate truth table.
- 2. Using a 74LS02 quad NOR gate, verify the NOR gate truth table.

Part II: Gate properties

- 3. Measure the input and output characteristics for this gate. What voltage is the input transition from high to low? Is there a difference in the transition levels for going from low to high? Are they within specifications?
- 4. What happens if you forget to tie an input to its appropriate level?
- 5. Use a gate and look at the delay between the input transition and the output transition. Is it within spec? Take a screen shot on your scope and print it out to show your measurement.
 - 6. What are the input and output impedances?

Part III: Combinatorial logic

- 7. Use only NAND gates to construct a circuit that operates as a three-input NAND gate.
- 8. Use only NAND gates to construct a two input XNOR (exclusive NOR) gate. The XNOR truth table is shown below.

XNOR Truth Table

\boldsymbol{A}	B	$\overline{A \oplus B}$
0	0	1
1	0	0
0	1	0
1	1	1