ECE 301 Digital Electronics
Basic Gates

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OBJECTIVE

To demonstrate the function of basic logic gates and the use of integrated circuits containing more than one logic gate.

PREPARATION

Construct the logic circuit shown on the bottom of this page.

PROCEDURE

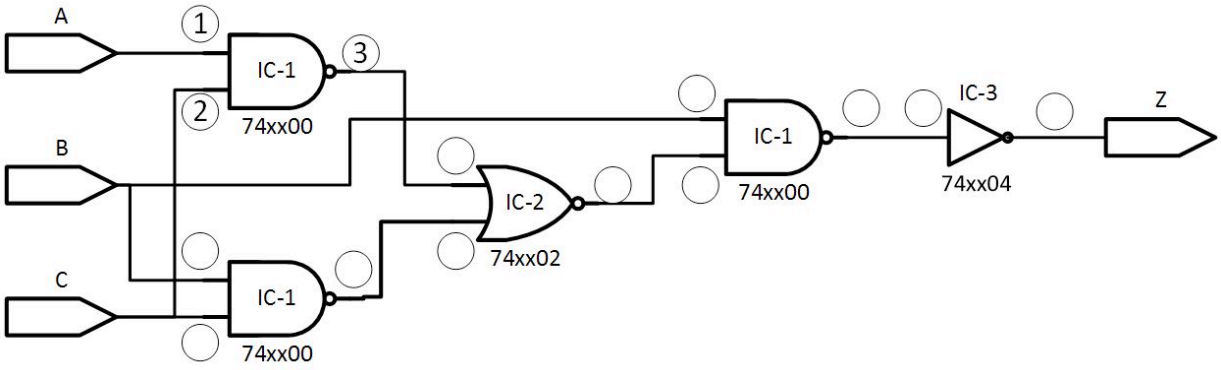
1. Using the following information for the various chips you have purchased, determine:
   - The truth table for each gate in the circuit
   - The type of gate packaged in each chip
   - The truth table for the entire circuit

2. Before connecting the +5 volt supply (V_{cc}) to your circuit check the value with the multimeter. The value must be within ±5% otherwise the integrated circuit chip may be damaged. The pin numbers for the power and ground can be found in the data sheet and may be different for different chips.

3. Use the logic lights to examine the output and input of each gate. Use the logic switches to vary the inputs, A,B, and C, through all possible combinations.

4. See the data sheets for pin connections. IC-1 shows an example of how to label integrated circuits on a circuit diagram. IC-1 means integrated circuit #1. The 74xx00 below the gate refers to a NAND gate in IC-1. The circled numbers at the connections are the pin numbers on the integrated circuit. IC-1 uses pins 1, 2, and 3 to connect to one of the NAND logic gates that is inside the 74xx00 chip. The other circles are left blank for you to fill in.

5. A, B, C are inputs to the circuit. Z is the output from the circuit.



6. Determine the type of three input logic gate that corresponds to each of the following timing diagrams, and verify your solution experimentally.